





Akademiya Nauk SSSR

1530

FLORA of the U.S.S.R.

Volume VII

V. L. Komarov, Editor

Ranales and Rhoeadales

TRANSLATED FROM RUSSIAN

Published for the Smithsonian Institution
and the National Science Foundation, Washington, D.C.
by the Israel Program for Scientific Translations

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Bot.
② BOTANICHESKII INSTITUT, AKADEMII NAUK SSSR

Botanical Institute of the Academy of Sciences of the U.S.S.R.

FLORA OF THE U.S.S.R.

(Flora SSSR)

Volume VII

Ranales and Rhoadales

Chief Editor Academician V. L. Komarov

Volume Editor B. K. Shishkin

Compiled by

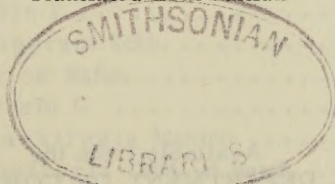
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Izdatel'stvo Akademii Nauk SSSR

Moskva-Leningrad

1937

Translated from Russian



Israel Program for Scientific Translations
Jerusalem 1970

Published Pursuant to an Agreement with
THE SMITHSONIAN INSTITUTION
and
THE NATIONAL SCIENCE FOUNDATION, WASHINGTON, D.C.

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Israel Program for Scientific Translations Ltd.
IPST Cat. No. 5667

Translated by Z. Blake

Edited by Professor J. Lorch

Printed in Jerusalem by Keter Press
Binding: Wiener Bindery Ltd., Jerusalem

Available from the
U.S. DEPARTMENT OF COMMERCE
Clearinghouse for Federal Scientific and Technical Information
Springfield, Va. 22151

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SUBJECTS AND CONTRIBUTORS

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Characteristics of the Ranales and key for the comparison of families of Nymphaeaceae, Ranunculaceae, Menispermaceae; genus *Schizandra*; characteristics of Rhoeadales and key for the comparison of families

Arranged by V. L. Komarov

Family Ceratophyllaceae

Arranged by O. I. Kuzeneva

Genera *Paeonia*, *Caltha*, *Trollius*,

Hegemone, *Callianthemum*,

Eranthis, *Leptopyrum*, *Enemion*,

Isopyrum, *Semiaquilegia*, *Para-*

quilegia, *Coptis*, *Actaea*, *Cimicifuga*

Arranged by N. V. Shipchinskii

Genera *Helleborus*, *Nigella*, *Atragene*,

Clematis, *Myosurus*

Arranged by I. M. Krasheninnikov

Genus *Aquilegia*

Arranged by A. A. Bulavkina

Genera *Delphinium*, *Thalictrum*

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Genus *Aconitum*

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Genera *Anemone*, *Hepatica*,

Pulsatilla

Arranged by S. V. Yuzepchuk

Genera *Ceratocephalus*, *Oxygraphis*,

Halerpestes, *Ficaria*, *Ranunculus*,

Trautvetteria

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Genus *Batrachium*

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Genus *Adonis*

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Family Berberidaceae

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Families Magnoliaceae (with the exception of the genus *Schizandra*), Anonaceae,

Lauraceae

Arranged by I. V. Palibin

Family Papaveraceae

Arranged by M. Popov

Reports on plant fossils

Arranged by A. N. Krishtofovich

Addenda — Descriptiones plantarum novarum in tomo VII Florae URSS commemoratarum

The plates were drawn by the following artists: Z. V. Kobyletskaya — I; S. A. Moiseva — II, IV, V, VIII, IX–XI, XXI, XXII, XXV, XXXVIII–XLIII; E. G. Blagoveshchenskaya — III; O. P. Voronova — VI, XX, XXVII; M. R. Gabe — VII; M. M. Parfenenko — XII–XIV, XXIII, XXIV, XXVI–XXXIV, XXXVI; T. L. Yuzepchuk — XV–XIX; E. A. Derevitskaya — XXV.

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5060.	6. <i>L. darwasica</i> Rgl.	550
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5158.	6. <i>C. Ledebouriana</i> Kar. et Kir.	635
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5197.	45. <i>C. bucharica</i> M. Pop.	693
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5201.	49. <i>C. pseudoadunca</i> M. Pop.	696
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5203.	51. <i>C. macrocalyx</i> Litw.	697

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Section 9. *Oreocapnos* M. Pop.

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5206.	54. <i>C. tenella</i> Kar. et Kir.	700

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5207.	55. <i>C. pallida</i> Pers.	700
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Section 11. *Glaucæ* M. Pop.

5208.	56. <i>C. sempervirens</i> (L.) Pers.	701
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5211.	59. <i>C. Raddeana</i> Rgl.	704
5212.	60. <i>C. sibirica</i> (L. f.) Pers.	704
5213.	61. <i>C. impatiens</i> (Pall.) Fisch.	705

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5215.	2. <i>F. Thuretii</i> Boiss.	708
—	3. <i>F. pikermiana</i> Boiss. et Heldr.	708
5216.	4. <i>F. rostellata</i> Knaf	709
5217.	5. <i>F. Kralikii</i> Jordan	709
5218.	6. <i>F. micrantha</i> Lag.	710
5219.	7. <i>F. officinalis</i> L.	713
5220.	8. <i>F. Schleicheri</i> Soy.-Will.	713
5221.	9. <i>F. parviflora</i> Lam.	714
5222.	10. <i>F. Vaillantii</i> Loisl.	715
—	11. <i>F. asepala</i> Boiss.	715

Genus 561. *Fumariola* Korsh.

5223.	1. <i>F. turkestanica</i> Korsh.	716
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PREFACE

The seventh volume of "Flora of the USSR" includes the whole order Ranales and part of the order Rhoadales, namely the Papaveraceae. A total of 8 families, 61 genera, and 703 species is dealt with.

The Ranunculaceae are one of the most popular and widely known families of the USSR. Their pungent taste, and their tendency to cause skin inflammations protect these plants from being eaten by cattle. As a result, golden buttercups are often found on grazed pastures. Spring begins its triumphal procession with millions of anemones and other flowers of closely related genera. In the Caucasus, clematis adorns forest margins with magnificent curtains of its decorative vines and a profusion of white flowers. Throughout one-sixth of the earth's land surface the Ranunculaceae are man's constant companions. At the same time, they have a place of honor in our gardens.

In the opinion of many students of phylogeny, possibly the Anonaceae, the Magnoliaceae, and perhaps also the Ranunculaceae may be the families most closely related to the common ancestors of all flowering plants. For this reason, these families deserve particular attention.

Barberries and poppies, which are also included in this volume, are of practical value. The roots of monkshood are known for their toxic effects on the heart.

The first six volumes of "Flora of the USSR" have recently been the subject of criticism. They have been criticized 1) for adherence to Engler's system; 2) for the many omissions in the lists of regions where the plants occur; 3) inexactitude, particularly in numbers; 4) for the lack of maps of distribution areas, etc. To these criticisms the editors wish to reply: Engler's system, as presented in his Syllabus and in the work of Della Torre and Harms, "Genera Siphonogamarum," is the only system on which work has been completed. By adhering to it the compilers of the Flora save an immense amount of time.

The criticism with regard to omissions and inexactitude is justified and this state of affairs must be remedied. It is not worthwhile to publish separate supplements devoted to genera and families. Instead, exhaustive supplements will be published as soon as compilation of the missing material has been completed.

Lastly, there are some comments with which it is simply impossible to agree; these concern the treatment of particular species. A critic who disagrees with the author should publish a critical article in which his claim is supported by facts. The publication of poorly supported comments is simply useless, for the change of a single term will add nothing to our knowledge.

We hope that every reader and critic of the Flora will understand that the avoidance of occasional inaccuracies is less important than the progress of work on subsequent volumes. It is obviously impossible that on conclusion of each single volume, the compilers should immediately divert their energies to making corrections. Instead it is their duty to concentrate on the completion of the entire work.

The Editors

1 Order 20. **Ranales** ENGLER

Arrangement of flower parts spiral, spirocyclic, or cyclic; flowers rarely monochlamydeous, usually with two floral envelopes; ovary superior; stamens mostly numerous; carpels 1, mostly numerous, distinct, rarely united; formation of pollen tetrads typically successive, pollen grains often trinucleate; archesporium nearly always multicellular. Endosperm usually present. Trees, shrubs, herbs, climbers, and aquatic plants.

Key to Families

- 1. Aquatic plants 2.
- + Terrestrial plants 4.
- 2. Leaves flat, more or less entire; flowers large, rarely medium-sized, with distinct calyx and corolla
Family LXI. Nymphaeaceae DC.
- + Leaves divided into narrow linear or filiform segments; rarely, except in submerged plants, floating leaves present, orbicular, reniform or broad-ovate; more or less lobed, always small 3.
- 3. Perianth scarcely discernible, 9–12 narrow green tepals, flowers axillary, sessile, fruit an achene with slender spines at base
Family LXII. Ceratophyllaceae A. Gray.
- + Perianth with calyx and corolla; fruit numerous 1-seeded nutlets clustered in a head; flowers axillary or terminal, on long pedicels
Family LXIII. Ranunculaceae Juss. (genus Batrachium).
- 4. Leaves peltate; flowers dioecious; the plant twining; fruits black, succulent, berrylike, with moon-shaped stone
Family LXV. Menispermaceae DC.
- + Leaves not peltate; flowers monoecious, mostly perfect, seeds straight. . . 5.
- 5. Stamens 6, in 2 whorls; anthers dehiscent by valves, gynoecium uni-carpellate, fruit a berry
Family LXIV. Berberidaceae Torr. et A. Gray.
- + Stamens not less than 9, mostly number indefinite; anthers dehiscent by a suture 6.
- 2 6. Stamens 9–12, in 3–4 series of 3; flowers apetalous, gynoecium uni-carpellate; aromatic trees and shrubs
Family LXVII. Lauraceae Lindl.
- + Stamens numerous, perianth mostly petaloid, pistil usually of numerous carpels 7.
- 7. Trees or small climbers, fruit aggregate or cone-shaped or as a cluster of red berries borne on an elongate receptacle.
Family LXVI. Magnoliaceae I. St. Hil.

- + Herbs, shrubs, or climbers; pistil of one or many carpels, apocarpous . . . 8.
- 8. Sepals 3, petals 6 Family Anonaceae.
- + Sepals 3-15, petals (if present) 5 or more
- Family LXIII. Ranunculaceae Juss.

Family **NYMPHAEACEAE** DC.

Flowers solitary, arrangement of flower parts spirocyclic or cyclic, with calyx and corolla; receptacle convex or cup-shaped, in the latter case united with carpels; perianth segments 6 to very many, stamens as many as tepals; carpels 3 to very many, the single ovule of each with 2 integuments; seeds often fleshy, with or without endosperm; embryo with thick cotyledon; formation of pollen tetrads successive, pollen grains trinucleate; endosperm transitional from cellular to nuclear. Perennial aquatic herbs with well-developed rootstocks; leaves submerged, floating, in one case aerial; 8 genera and ca. 100 species, almost ubiquitous in the USSR, except in the Arctic and in deserts.

Representatives of some genera, such as *Nelumbium* and *Brasenia*, have been found in Tertiary deposits far beyond the limits of their present-day distribution and even in the north.

Brasenia purpurea (Michaux) Casp., in Postpliocene deposits of U. V. (Borok in Bezhet'sk District). — *B. purpurea* Mich. f. *holarctica* Weber, in interglacial deposits of U. Dnp. (Kletsova Smolensk).

Nelumbium sp. from the Tertiary of Ob (Tavda); Irt. (Tara); Balkh. (Ashutas); Sakh. (Rogatyi, Machi, Nikolaevka, Egranvis, etc.). *N. pacificum* Pojark., in Sakh. Also in Uppermost Cretaceous deposits of Ze. Bu. (Tsagayan on the Bureya River). — *Nuphar luteum* Smith, in interglacial deposits of U. V. (Troitskoe near Moscow).

Nymphaea alba L., in interglacial deposits of U. Dnp. (Prechistaya, Smolensk area, Timoshkovichi in the Minsk area), U. V. (Borok village, Troitskoe). — *Nymphaeites tenor* Heer, in Upper Cretaceous of Ob (Simonova). — *Euryale ferox* Salisb., in interglacial deposits of V.-Don (Likhvin).

3 Key to Genera

1. Some leaves borne on long erect petioles, peltate; flowers large, bright pink; receptacle an inverted cone, its recesses containing distinct carpels (later achenes) 501. *Nelumbium* Juss.
- + All leaves floating or submerged 2.
2. Young leaves and buds protected by a mass of transparent jelly; flowers small, dark purple 502. *Brasenia* Schreb.
- + Jelly wanting; flowers white, yellow, or blue 3.
3. Leaves wide, orbicular, very prickly; flowers blue. . . 503. *Euryale* Salisb.
- + Leaves glabrous; flowers white or yellow 4.
4. Sepals 5; petals small, narrow; stamens hypogynous; flowers yellow 504. *Nuphar* Sm.

+ Sepals 4; petals wide; stamens perigynous; flowers white
. 505. *Nymphaeae* L.

Subfamily 1. **NELUMBONOIDEAE** Casp. (Family *Nelumbonaceae* Lindl., 1836).—Carpels immersed in a fleshy receptacle.

Genus 501. **NELUMBium*** JUSS.

Juss. Genera (1789) 68.

Flowers solitary, sepals 4–5, the numerous petals and stamens attached to sepals and shed together with them, the many carpels each separately disposed in the recesses of the obconic receptacle; styles short; pendulous ovules solitary or in pairs; seeds exalbuminous. Large aquatic herbs with well-developed ramified nodose rootstocks. Submerged leaves sessile and squamiform, floating leaves orbicular and flat, aerial leaves large, peltate, with long petioles. Russian name: lotos [lotus].

1. *N. nuciferum* Gärtn., Fruct. I (1788) 73; Grossg., Fl. Kavk. II, 88.—*N. speciosum* Willd. Sp. pl. II (1799) 1258; Ldb., Fl. Ross. I, 83; Schmal'g., Fl. I, 35; Kom., Fl. Manchzh. II, 215.—*Nymphaea nelumbo* L. Sp. pl. (1753) 511; Karsten., Deutsch. Fl. ed. I (1880) 553.—*Cyamus nelumbo* Smith, Exot. Bot. I (1804) 59.—*Nelumbo mysticus* Salis., Ann. of Bot. II (1806) 75.—*N. asiaticum* Rich. in Ann. Mus. Paris XVII (1811) 249.—*N. caspicum* Eichw. Pl. nov. Casp. Cauc. (1831) 2; Shipchinskii in Fl. Yugo-Vost. IV, 314.—Ic.: Kom. i Alis., Opred. rast. Dal'nevost. kraya I (1931) tab. 152–155; S. G. Gmelin., Reise Beschr. III, tab. 44, 45.—Exs.: Fl. cauc. exs. no. 230 cum icone.

4 Perennial; aerial leaves large, peltate, suborbicular, entire, to 50 cm in diameter, glaucous due to a waxy bloom, dark green above, pale beneath, a convex pulvinus with central stoma on upper surface at point of attachment to the petiole; petioles erect, 1 m or even to 2 m long, smooth or with small sparse acicular bristles; the flat floating leaves much smaller, with flexible petioles. Flowers ca. 23 cm in diameter, petals pink, oblong or elliptic, subobtusate, filaments enlarged below the yellow anthers; mature seeds dark gray, ca. 1.5 cm long. July–August.

Shallows of well-warmed oxbows, on silty-sandy bottom; in years when the water rises considerably above its normal level, the lotus does not bloom.—European part: L. V. (Volga Delta, e.g., at the village of Chulpan); Caucasus: E. Transc. (lower reaches of the Kura River); Far East: Ze.-Bu., Uss. Cited by Karelin for the Aral Sea, according to information not subsequently confirmed. Gen. distr.: Iran., Ind.-Him., Jap.-Ch., Malay Archipelago. In Japan and Korea only as a cultivated plant. Introduced into European horticulture by Banks, in 1787; grows only in temperate waters not cooler than 20°C. Described from India. Type in the Linnaean Herbarium.

Economic importance. In India, China, and Japan cultivated for its edible roots and seeds. The rootstock yields meal of excellent quality,

* From *Nelumbo*, as this plant is called in Ceylon.

called in Chinese "ou-feng" (see I. Palibin, in. Izv. Botan. Sada, IV, 1904, 60-66). In China each part of the plant, e. g., the seeds and the rootstock, is used as a separate medicine. In addition to starch the rootstock contains as much as 2% asparagine, and the petioles and buds yield a cardiac poison, the alkaloid "nelumbin" (Wehmer).

Note. Eichwald tried to separate plants from the Volga Delta lakes as a distinct species on the basis of the inner petals being slightly smaller than the outer ones and obtuse, but this distinction has not been confirmed. In fact, the Indian lotus differs from the USSR plant only in that its flowers are often white; the first plants introduced into European horticulture under the name lotus also had white flowers.

Although the Caspian and Far Eastern lotuses are taxonomically identical, there is a difference between fruiting specimens: the Caspian lotus has 10-20 seeds per flower, as against 20-35 seeds in the Far Eastern lotus.

Subfamily 2. **CABOMBOIDEAE** Casp. (Family Cabombaceae A. Gray, 1837). — Carpels 2-18, apocarpous; receptacle insignificant.

Genus 502. **BRASENIA*** SCHREB.

Schreb. Gen. (1789) 372.

Flowers axillary; stamens 12-18, with slender filaments; carpels 4-18, apocarpous, nutlets indehiscent, coriaceous, 1-2-seeded. Stems long, branched, like the petioles, anthers, and lower leaf surface coated with a layer of transparent jelly; leaves alternate oval entire, centrally peltate, with palmate venation.

1. *B. schreberi* J. F. Gmel., Syst. veg. I (1791) 853. — *B. peltata* Pursh, Fl. Am. Sept. (1814) 389. — *B. purpurea* Casp. in Nat. Pfl. III, 2 (1890) 6; Kom., Fl. Manchzh. II, 216. — *Hydropeltis purpurea* Mich., Fl. Bor. Am. I (1803) 324. — Ic.: Mich., l. c., tab. 29; Britt. and Br. III. Fl. ed. 2, II, 76.

Perennial; rootstock long, rather slender; branched, horizontal; stems curved, rising almost to the surface, occasionally branching; leaves alternate, peltate, the floating leaves oblong, rounded at both ends, thickish, 5-10 cm long, 3-5 cm wide, often purple beneath; petioles of unequal length; flowers solitary on axillary pedicels of unequal length, 1-1.2 cm in diameter, dark purple; sepals and petals sublinear, in threes; stamens 12-18, with filiform filaments; fruit 4-18 oblong, 1-2-seeded, indehiscent, coriaceous; nutlets 4-8 mm long. July-September (Plate I, Figures 3, a-c).

In groups on silty ground in oxbow lakes. — Far East: Ze.-Bu. (Bureya and Amur rivers), Uss. (Ussuri River, tributaries of Lake Khanka, Suifun River). Gen. distri.: N. Am. from Nova Scotia to Cuba and Mexico, from Washington to California; Japan and China, India, Australia.

Note. A relic; seeds were found in the Cretaceous of North America and Pliocene and interglacial deposits of Europe.

* The origin of this name is obscure.

Subfamily 3. **NYMPHAEOIDEAE** CASP. (Family Nymphaeaceae DC., 1816). — Carpels firmly united into a compound pistil with a many-rayed sessile stigma.

Genus 503. **EURYALE*** SALISB.

Salisb. in Koenig et Sims. Ann. of Bot. II (1805) 73.

Flowers violet-blue, partly submerged, calyx 4-lobed, petals many, 3–5-seriate, shorter than calyx; stamens many, multiseriate, with linear filaments; pollen grains globose, trinucleate; ovary 8-locular, immersed in a widened upper part of receptacle; stigmas circular, concave; fruit a spongy subglobose berry covered by sepals, with 8–20 seeds; endosperm farinaceous. Large stemless plants, densely covered with prickles. Leaves orbicular, with undulate blades.

6 1. **E. ferox** Salisb. in Ann. of Bot. II (1806) 73; Kom., Fl. Manchzh. II, 217; Skvortsov, Gigantskaya kuvshinka Sungariiskikh ozer [The Giant Water Lily of the Sungari Lakes] (1925) 1–9; Kom. i Alis., Opred. rast. Dal'nevost. kraya I, 506. — Ic.: Skvortsov, pp. 4–6; Kom. i Alis., l. c., plates 156–158.

Annual; all leaves long-petioled, the lowermost in young plants sagittate later flat rounded-oval, mature leaves more than 130 cm in diameter, petioles and prominent veins studded with numerous small sharp prickles; leaf blades firm, coriaceous, with numerous abaxial concavities containing air, which supports the leaves on the water; bright green with a waxy bloom above, red-violet beneath. Pedicels long, stout, very prickly; sepals connate in lower part and adnate to receptacle, densely covered with retrorse spines; petals bright, blue-violet, numerous, gradually passing into stamens with dilated filaments; ovary globose, 8-loculed; stigma red, stellate; fruit light red, globose, weighing up to 200 g, covered with strong prickles; seeds greenish at first, turning black, rounded, with thick strong tegmen and loose outer mucous membrane imparting buoyancy. July–September.

River valley lakes, down to a depth of 1.3 m; flowers self-pollinated, opening only during the morning hours, submerged after pollination. — Far East: Uss. (reported for the lower reaches of the Iman and Lefu rivers). Gen. distr.: Jap.-Ch., Ind.-Him. Described from India. Type in London.

Economic importance. The starchy, edible seeds are collected in large quantities in China, where they are considered to be of medicinal value. The Chinese boil the fruits in salt water; they eat the fruits as well as the seeds (B. Skvortsov).

Note. *Euryale* — a relic of the Tertiary flora, known from Pliocene and later deposits in Europe.

* A poetic name for the mythological Gorgon or Medusa, referring to the frightening aspects of its fruits

Genus 504. **NYMPHAEA*** L.

L. Sp. pl. (1753)510; Gen. pl. ed. 5(1754)227.

Flowers solitary, in many colors; calyx with 3-5, usually 4 lobes; petals 12-40, multiseriate; stamens 20-700, multiseriate, perigynous, their filaments broad, often petaloid; carpels 8-35, immersed in a fleshy cup-shaped receptacle, with which they coalesce into a single fleshy ovary crowned by a broad, convex many-rayed stigma; fruit baccate, spongy-fleshy, ripening under water, dehiscing by irregular sutures; seeds with perisperm and peripheral tissue imparting buoyancy. A rhizomatous acaulescent plant; leaves cordate. Russian name: kuvshinka.

1. Leaf lobes inequilateral; stigma almost flat, yellow with a small hemispheric central projection 1. *N. alba* L.
- + Leaf lobes subequilateral, mostly acuminate; stigma strongly concave, with conical central projection, purple 2.
2. Flowers 8-12 cm in diameter, petals 15-25, gradually passing into stamens; stigma 6-15(20)-rayed, usually 12-16-rayed 2. *N. candida* Presl.
- + Flowers 4-5 cm, rarely 9 cm in diameter; petals 10-12, sharply contrasted with the stamens, stigma 7-19-rayed 3. *N. tetragona* Georgi.

1. *N. alba* L., Sp. pl. (1753) 510; Conard, The Waterlily, 175; Shmal'g., Fl. I, 34, Korzhinskii, Fl. Vost. Evr. Ross. (1892) 129 (subsp. *typica*); Aschers. u. Gr., Synopsis V, 2 (1923) 527; Ldb., Fl. Ross. I, 83 (ex parte).—*Castalia speciosa* Salisb. in Koenig u. Sims, Ann. of Bot. II (1805) 72.—*C. alba* Woodville u. Wood in Rees, Cycl. VI (1806).—*Nymphaea alba* var. *melocarpa* Caspary in Ind. sem. Horti Berol. (1855) app. 26.—*Ich.*: Rch., *Ich.* Fl. Germ. VII, tab. 67 f. 117.—*Exs.*: Herb. Fl. Cauc. no. 27.—Russian names: kuvshinka, belaya [white], belaya vodyanaya liliya [white water lily], belyi odalen', nenyufar, nimfeya.

Perennial; rootstock horizontal, covered with petiole remnants of shed leaves; stipules distinct, lanceolate; leaves cordate-oval, occasionally orbicular, in young plants more or less red, 10-30 cm in diameter, with divergent lobes; petioles traversed by 4 ducts and many stereids. Flowers faintly aromatic, 10-12 (5-21) cm in diameter; sepals oblong, attenuate at base, green beneath, greenish-white above, with 5 prominent nerves; petals numerous, white, the outer larger, the inner smaller, passing gradually into stamens, the filaments of inner stamens as broad as their anthers; pollen grains globose, pale yellow, pellucid, subaculeate by rod-shaped excrescences; stigmatic rays 8-24, yellow; fruit globose, green, many-celled, covered to its top with scars of shed stamens; seeds ellipsoid. June-September.

Forming thickets in standing and slowly flowing water down to a depth of 2 m; reaching its largest dimensions in deep lakes, in shallow water on partly dry shoals (*f. terrestris* Clavaud in Acta Soc. Linn. Bord. XXXV (1881) 263) small with short petioles.—European part: Kar.-Lap., Lad.-Ilm., U. Dnp., M. Dnp., V.-Kama, Transv., L. V., Bl., L. Don; Caucasus: Cisc., E. Transc. **Gen. distr.**: Scand. (to 68°11' N. lat.), Alt. Eur., Centr. Eur., Med., Bal.-As. Min. Described from Europe. Type in the Linnaean Herbarium.

Note. Particularly small specimens of *N. alba* from bodies of cold water were described as var. *minoriflora* Asch. u. Gr., Synopsis V,

* Name of aquatic plant used by Theophrastus.



PLATE I.

1 — *Nymphaea tetragona* Georgi, flower, from beneath; 2 — *N. candida* var. *minor* Wainio;
 3 — *Brasenia Schreberi* J.F.Gmel., a) stamen, b) carpel, c) flower.

8 2 (1923) 529 = *Leuconymphaea alba* var. *minoriflora* Borb. Balaton Flora (1900) 394, with flowers 5–8 cm in diameter. According to Ascherson, this form breeds true under cultivation. In the USSR it presumably occurs in the Ukraine.

2. *N. candida* Presl, Del. Prag. (1822) 224; Conrad, The Waterlily 172; Asch. u. Gr., Synopsis V, 2 (1923) 532; Syreishch., Ill. Fl. Mosk. gub. II, 133; Kryl., Fl. Zap. Sib. 1108; Fedchenko, Conspectus Fl. Turk. I, 25. — *N. alba* var. *minor* DC., Syst. nat. II (1821) 56; Ld., Fl. Ross. I, 84. — *N. pauciradiata* Bge. in Ldb., Fl. Alt. II (1830) 272; Ldb., Fl. Ross. I, 84. — *N. biradiata* Sommerauer in Flora (1833) 625. — *N. nitida* Ldb., Fl. Ross. I, (1842) 84, non Sims. — *N. Basniniana* Turcz., Fl. baic.-dah. I (1842) 93. — *N. Cachemiriana* Camb. in Jacquemont Voy. IV (1844) 11. — *N. punctata* Kar. et Kir. in Bull. Soc. Nat. Moscou XIV (1841) 376. — *Castalia speciosa* Besser, Enum. (1821) 22. — *C. colchica* Woron. ex A. Grossh. in Fl. Kavk. II (1930) 87. — *C. candida* Schinz u. Thell. in Bull. Herb. Boiss. 2 sér. VII (1907) 573. — Ic.: Rchb., Ic. Fl. Germ. VII, tab. 68, f. 118. — Exs.: Fl. exs. Austro-Hung. no. 1281; HFR no. 353a et b.

Perennial; rootstock as in the preceding species, up to 3 cm thick; leaves rounded-oval, 12–30 cm long, the veins of their lobes arcuately convergent, not divergent as in *N. alba*. Flowers almost odorless, 6.4–7.6 or 8–12 cm in diameter, half-open, white; calyx tetragonous at base, sepals ovate-oblong, green beneath, obtusely acuminate, very slightly shorter than the petals; petals obtuse, centripetally decreasing in dimensions and passing into stamens; filaments of inner stamens lanceolate; pollen grains elliptic, yellow, larger than in other USSR species, nonpellucid, with granular surface; ovary attenuate below the stigma and in this part bearing neither stamens nor their scars; stigma 6–15(20)-rayed, red (occasionally yellow), strongly concave centrally; seeds larger than in *N. alba*. June–September.

Lakes, ponds, oxbows, river backwaters, and slow-flowing forest streams. — European part: Kar.-Lap., Lad.-Ilm., U. Dnp., U. V., M. Dnp., Bl., V.-Don, V.-Kama, Transv.; Caucasus: W. Transc.; W. Siberia: Ob (to 57°80' or even 60° N. lat.), U. Tob., Irt.; E. Siberia: Yenisei, Ang.-Say; Centr. Asia: Kyz. K. Gen. distr.: Scand., Centr. Eur. Described from Austria (Styria). Type in Prague.

Note. Occasionally forms occur which are transitional between *N. alba* and *N. candida* and actually represent a hybrid, *N. alba* L. × *N. candida* Presl, sometimes referred to as *N. borealis* Camus. Plants closer to *N. alba* are referred to (*K. Valle*, Suomen Nymphaealajit Ann. Soc. Zool. Bot. fenn. Vanamo, vol. VII, 1927, 299), as *peralba*, those closer to *N. candida* as *f. per candida*, and intermediate plants as *f. intermedia*.

11 A form with leaves half the size of those in the type with small flowers 5 cm or more in diameter is separated as var. *minor* Wainio in Acta Soc. Faun. et Fl. Fenn. VIII (1891) 58. It occurs in Kar.-Lap. and Lad.-Ilm. in small bodies of cold water (Plate I, Figure 2).

Since the water bodies where *Nymphaea* plants grow are often very far apart, the difficulty in achieving crosses between two such stands of

even the same area contributes to the isolation of local forms; the latter have not yet been studied. Observations should be carried out on live material and especially on the shape and color of the stigma, which might reveal the still unknown infraspecific subdivisions of these plants.

Economic importance. The rootstock, as in *N. alba*, contains many tannides, occasionally used for tanning, and up to 20% starch, which is the edible element of the plant. The seeds contain 47% starch.

3. *N. tetragona* Georgi Bem., Reise in Russ. Reich., I (1775) 220; Conard, The Waterlily 167; Kom., Fl. Manchzh. II, 218; Kryl., Fl. Zap. Zib. I, 1109. — *N. pygmaea* Aiton, Hort. Kew. 2 edit. III (1811) 293; Turcz., Fl. baic.-dah. I, 93; Ldb., Fl. Ross. I, 84. — *Castalia pygmaea* Salisb., Paradisus Lond. I (1806) tab. 14. — *C. tetragona* Lawson in Trans. Roy. Soc. Canada 6, Sec. IV (1888) 112. — *Nymphaea acutiloba* Dc., Prodr. 1 (1824) 116. — *N. fennica* Mela in Acta Soc. Fauna et Fl. Fenn. XIV (1897) 3. — *N. alba* subsp. *tetragona* Korzhinskii, Fl. Vost. Evr. Ross. (1892) 133. — Ic.: Conard, l. c., tab. 14 et f. 65.

Perennial; rootstock horizontal or erect; leaves typical, 8 cm long, 7 cm wide, seldom to 27 cm long, 16 cm broad, rounded-oval or rounded-ovate, with subequilateral acuminate and more or less divergent lobes. Flowers 4–5 cm, in largest specimens 9 cm in diameter, their base sharply tetragonous, ovoid, after flowering becoming coriaceous and protecting the fruit; petals 10–12, differing sharply from the stamens; filaments of inner stamens dilated, ovate, pollen grains almost smooth or obscurely verrucose, ovary short-conical, smooth above, stigma strongly concave; receptacle with long conical central protruberance, purple, with 7–10 (usually 8) rays; fruit rounded-conical, the peduncle often spirally twisted. June–September. (Plate I, Figure 1).

Lakes, river backwaters, and most frequently in small oxbow lakes; in thickets on silty bottom. — European part: Kar.-Lap., Dv.-Pech., V.-Kama; W. Siberia: Ob, Irt.; E. Siberia: Yenis., Ang.-Say., Lena-Kol., Dau.; Far East: Kamch., Okh., Ze.-Bu., Uda, Uss., Sakh.; Gen. distr.: N. Am. (Canada, Idaho), Jap.-Ch., Ind.-Him. (Khasi Hills region). Described from the banks of the Lena River (Gmelin's collection). Type in Germany.

12 **Economic importance.** In Japan the seeds and leaf buds are used as food. An ornamental plant, cultivated in England since 1805, suitable for aquariums. All species of *Nymphaea* are highly decorative; they should be grown together with other cultivated plants in ponds whether in parks, or elsewhere, and propagated wherever possible.

N. wenzelii Maack in Puteshestvie na Amur (1859) V, plate I; Regel, Opyt Flory Ussuriiskoi strany [Provisional Flora of the Ussuri Region] (1861) 19; Conard, The Waterlily, 172. — Ic.: Maack, l. c., tab. 1; Rgl., Fl. Uss. tab. 1.

On the basis of an illustration in Maack's work, Conard refers this plant to a number of synonyms of *N. candida* Presl, while Regel refers it to *N. acutiloba* DC.; Conard refers the latter to *N. tetragona* Georgi. *N. candida* has not yet been found in the Amur and Ussuri areas, but *N. tetragona* is extremely common, growing in masses and often reaching very large dimensions. Specimens collected by Maack have been

preserved, but they differ greatly from the large-flowered forms of *N. tetragona* by their coriaceous rounded-oblong leaves; if they are indeed close to the large-flowered form of *N. tetragona*, with a spurlike point below the leaf lobes, then it appears as if their coriaceous quality and oblong shape had been "borrowed" from *Nuphar pumilum* (Hoffm.) DC. Either the flowers of one were mixed up with leaves of the other, or else Maack happened to find an intergeneric hybrid. On the basis of existing specimens, it is difficult to decide this point.

Collected in a lakelet on one of the islands in the Amur River, opposite the village of Pakhale, 60 km above the mouth of the Gorin River. Type in Leningrad.

* *N. candida* × *N. tetragona* H. Hjelt, *Consp. Fl. Fenn.* III (1906) 282. — Reported for central Finland; in the USSR, expected to be found in Kar.-Lap. and other localities, where both species grow. Mention should also be made here of the abortive pollen, which is characteristic of the hybrid.

Genus 505. **NUPHAR*** SMITH

Smith in Sibth. *Fl. Graec. Prodr.* I (1809) 361.

Flowers solitary, yellow; sepals 5–6, petals numerous, narrow, similar to stamens, hypogynous; stamens and carpels numerous, the latter conerescent into a compound fleshy ovary crowned by an 8–24-rayed stigma; fruit ovoid, naked; seeds exalbuminous. Plants with thick rootstocks; leaves deeply cordate. Russian name: kubyshka.

1. Stigma concave, with 10–20 rays not reaching the entire margin 1. *N. luteum* (L.) Sm.
+ Stigma slightly concave, 9–16-rayed * *N. luteum* × *pumilum*.
+ Stigma convex, with dentate margin, 8–10-rayed 2. *N. pumilum* (Hoffm.) DC.

- 13 1. *N. luteum* (L.) Sm. in Sibth. et Sm., *Fl. Graec. Prodr.* I (1808–9) 361; Ldb., *Fl. Ross.* I, 84; Turcz., *Fl. baic.-dah.* 1, 94; Shmal'g., *Fl.* I, 33; Kryl., *Fl. Zap. Sib.* 1110. — *Nymphaea lutea* L. *Sp. pl.* (1753) 510. — *Nymphozanthus vulgaris* L. C. Rich. in *Ann. Mus. Paris*, XVII (1811) 230. — *N. luteus* Fernald in *Rhodora* XXI (1919) 185. — *Ic.*: Rchb., *Ic. Fl. Germ.* VII, tab. 63, f. 113, tab. 64, f. 114.

Perennial; rootstock thick, fleshy, covered with scars of shed leaves; lower leaves submerged, with very short petioles, semipellucid, thin, with undulate margins; upper leaves floating, their petioles long, trigonous above with obtuse ribs, the leaf blade cordate-oval, rounded above, firm, subcoriaceous, entire, deeply cordate. Sepals thick, 20–30 mm long, orbicular, dark yellow above, green beneath, strongly concave, campanulately convergent; petals numerous, with a nectar-pit on their outer side, obovate, yellow, shorter than sepals; petals and anthers inserted on the receptacle; anthers oblong-linear, yellow; ovary ovoid-conical with enlarged, almost

* The name for this plant used by Dioscorides.

infundibular stigma; fruit smooth, with many fruitlets, multilocular, gelatinizing on ripening. June–September.

Lakes, small oxbow lakes, backwaters, slow-flowing sections of rivers; in thickets. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. Dnp., M. Dnp., V.-Don, Transv., Bl., L. Don, L. V.; Caucasus: Cisc., W., S., and E. Transc.; W. Siberia: Ob (to 64° N.lat.), U. Tob., Irt., Alt. (Salair); E. Siberia: Yenisei. (to 66°30' N.lat.), Lena-Kol., Ang.-Say.; Centr. Asia: Ar.-Casp. Gen. distr.: W. Eur. to 68°30' N. in Finland; Med., Bal.-As. Min. Described for fresh-water bodies in Europe. Type in the Linnaean Herbarium.

2. *N. pumilum* (Hoffm.) DC., Syst. veg. II (1821) 59; Ldb., Fl. Ross. I, 85; Kryl., Fl. Zap. Sib. 1111; Shmal'g., Fl. I, 34; Turcz., Fl. baic.-dah. I, 95; Kom., Fl. Manchzh. II, 219. — *Nymphaea pumila* Hoffm., Deutschl. Fl. ed. 2, I (1800) 241. — *Nuphar minimum* Sm. Engl., Bot. XXXII (1811) tab. 2292. — *Nymphaea minima* Willd., Enum. Hort. Berol. Suppl. (1813) 38. — Ic.: Sm., l. c.

Perennial; rootstock thick, up to 1 cm or in the Far East up to 2 cm in diameter; floating leaves deeply cordate, 4.5–15 cm long, 3.5–11 cm broad, in the Far East up to 19 cm long and 13 cm broad, convex above, pubescent beneath, petioles flat-rhombic. Flowers 2–3 cm in diameter, yellow, sepals ovate, 1.2–2.2 cm long, yellow above, green beneath; petals sharply narrowed into a claw; anthers almost tetraginous; stigma almost flat, more or less stellate, 7–14-rayed, deeply sinuate; fruit straight or recurved, fruitlets 80–180. June–September.

Distribution as for the preceding species, but in Europe very scattered forming small thickets. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, Transv.; W. Siberia: Ob (to 64° N.lat.), U. Tob., Irt.; E. Siberia: Yenisei., Lena-Kol., Ang.-Say., Dau.; Far East: Kamch., Okh., Ze.-Bu., Uss., Sakh.; Gen. distr.: Scand., Centr. Eur., Mong., Jap.-Ch. Described from Europe. Type in Geneva.

* *N. luteum* × *N. pumilum* = *Nuphar luteo-pumilum* Caspary in Bot. Notiser (1879) 89. — *N. Spennerianum* Gaud., Fl. Helv. III (1828) 439. — *N. minima* Spenner in Flora X (1827) 115. — *N. intermedium* Ldb. Fl. Alt. II (1830) 274.

In dimensions and habitat this plant occupies an intermediate position between the two parent species; upper part of petioles somewhat flattened, subtrigonal to trigonal, leaves glabrous, usually 8–18 cm long, 6–17 cm broad, their lobes approximate or even overlapping. Flowers small or medium-sized, pollen abortive with no more than 75% fertile grains, stigma 9–14(16)-rayed, somewhat depressed centrally; fruit with 6–40, rarely up to 70 fruitlets. June–August.

Quiet backwaters. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., V.-Kama, U. V.; W. Siberia: Ob, U. Tob., Irt. Gen. distr.: Scand., Centr. Eur.

* *N. advenum* R. Br. in Ait. Hort. Kew. ed. 2, III (1811) 295. — *N. advenum* Soland. ex Syreishchikov, Ill. Fl. Mosk. gub. IV (1914) 72. — *Nymphaea advena* Soland. in Ait. Hort. Kew. II (1789) 226. — *Nuphar americana* Provancher, Fl. Canad. I (1862) 28.

* Treatment by O.I. Kuzeneva.

Perennial; floating as well as aerial leaves ovate to orbicular-oval, up to 30 cm long, 22 cm broad, notched to a depth of 12 cm, somewhat divergent toward the base; submerged leaves suborbicular, thin; blades and petioles of aerial leaves often pubescent beneath. Flowers 3–8.5 cm in diameter, yellow, often with reddish tinge; sepals 6, oblong, strongly concave; petals fleshy, oblong, truncate; stamens 5–7-seriate, anthers as long as filaments; stigma with an undulate, 12–24-rayed yellow or pale red disk; fruit ovoid, with a shallow constriction at the neck. July–August.

River backwaters; growing wild, adventive. — European part: U. V. (Savvinsk in Zvenigorodka District). Gen. distr.: from the Rocky Mountains through the eastern states of N. Am. Described from cultivated specimens. Type in London.

Family LXII. **CERATOPHYLLACEAE** A. GRAY*

15 Flowers unisexual, monoecious, with simple perianth; perianth of staminate flowers with 12 tepals, connate only at base. Stamens 10–16, filaments obsolete but anthers very long. Pistillate flowers with 8–12 tepals; ovary superior, unilocular; ovule pendulous, single; style long. Fruit a 1-seeded achene. Seeds black-brown, with thin testa.

Ceratophyllum demersum L., in Second Interglacial of U. Dnp. (Kletsova); U. V. (Likhvin). — *C. tanaiticum* Sapjég., in Postpliocene deposits. — *C. sniatkovii* Krysht., in Samaria deposits of Bl. (Krynka).

Genus 506. **CERATOPHYLLUM*** L.

L. Gen. pl. ed. I (1737) 1055.

Flowers solitary, in axils of leaves. Perianth of staminate flowers whitish, tepals oblong, 2–3-toothed; stamens slightly longer than perianth; anthers 2-locular with a massive connective, terminating in 2 small prickles. Perianth of pistillate flowers greenish. Style as long as or slightly longer than the ovary, thinner toward the end. Fruit mostly with spreading style forming an apical spine, often with 2 or 4 accessory spines, with smooth margin or winglike border. Perennial aquatic plants with articulate stems; leaves whorled, forked into filiform or linear lobes. Winter dormant, forming compact terminal buds which in spring grow into a complete plant.

- 1. Margin of fruit wingless 2.
- + Margin of fruit conspicuously winged 5.
- 2. Fruit with single spinule above, many times as long as the spinule;
leaves dichotomously 2–3-partite 4. *C. submersum* L.
- + Fruit with several (3 or 5) spines, the apical spine longer than the fruit;
leaves 1–2-partite 3.
- 3. Fruit smooth-surfaced, with 3 spines 1. *C. demersum* L.
- + Fruit with a dorsal spine or outgrowth 4.

* From Greek *ceras*, a horn, and *phyllon*, a leaf.

4. Dorsal spines of fruit straight, rigid 2. *C.oryzeturum* Kom.
- + Fruit with dorsal tubercle, outgrowth, or corniform spine 3. *C.komarovii* Kuzen.
5. Fruit smooth, flattened, with obsolescent spines. Leaves dichotomously parted 3-5 times 5. *C.tanaiticum* Sapjag.
- + Fruit with small tubercles and 3 spines; leaves dichotomously parted 3-5 times 6. *C.kossinskyi* Kuzen.

1. *C.demersum* L., Sp. Pl. (1753) 992; Ldb., Fl. Ross. II, 123; Shmal'g., Fl. II, 441; Kryl., Fl. Zap. Sib. V, 1113. — Ic.: Rchb., Ic. Fl. Germ. XXIII, tab. 32; Syreishch., Ill. Fl. Mosk. gub. II, 135.

16

Perennial; stem slender, smooth, 40-150 cm high, profusely branched in upper part; leaves in whorls of 4-12, dark green, 1.5-2 cm long, forked once or twice into 2-4 filiform linear lobes, 0.1-0.5 mm broad, sparsely and finely denticulate, acute, whitish-cartilaginous at apex. Flowers small, ca. 2 mm long; fruit oblong-ovate, 4-5 mm long, ca. 2 mm broad, with 3 spines: apical spine longer than fruit, usually twice as long, often terminating in a small hook; the 2 basal spines declinate, almost as long as or slightly longer than the fruit (in var. *apiculatum* (Cham.) Sapjag. the fruit many times as long as the lower spines). July. (Plate II, Figure 2).

Lakes, oxbows, ponds, small slow-flowing rivers, ditches. — European part: Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. Dnp., M. Dnp., V.-Don, Transv., Bl., L. Don, L. V.; Caucasus: Cisc., W. and E. Transc., Tal.; W. Siberia: all regions; E. Siberia: all regions; Centr. Asia: Ar.-Casp., Balkh., Kyz. K., Kara K., Mtn. Turkm., Syr. D., Pam.-Al., T. Sh. Gen. distr.: Centr. Eur., Atl. Eur., Med. Described from Europe. Type in London.

2. *C.oryzeturum* Kom. in Bull. Jard. bot. princ. URSS XXX, 1-2 (1932) 200. — *C. apiculatum* Rgl. et Maack in Rgl. Fl. Uss. (1861) no. 185, non Cham. in Linnaea IV, 503.

Perennial; stem smooth, branched; leaves once or twice dichotomously divided into 2-4 linear lobes, minutely denticulate. Fruit oblong, 4-5 mm long, 1.5 mm broad, with smooth wingless margin, broadly cuneate, with 5 firm spines: apical spine 7-10 mm long, twice as long as the fruit, the 2 basal spines widely and obliquely diverging, shorter than the apical, 6-8 mm long, in lower part flat, 0.4-0.6 mm thick, becoming subulate; the remaining 2 spines borne on either side in the upper third of the fruit, and perpendicular to it, 2-4 mm long, 0.4-0.5 mm thick, proximally slightly rounded or somewhat flattened, becoming subulate or straight, rarely slightly curved. (Plate II, Figure 3).

Oxbows, lakes, ditches. — Far East: Uss. Gen. distr.: China. Described from the vicinity of Voroshilov (formerly Nikol'sk-Ussuriiskii). Type in Leningrad.

3. *C.komarovii* Kuzen. sp. nova in Addenda VI, p. 550.

Perennial; stem slender, smooth, sparsely branched; leaves in whorls of 6-8, dark green, 15-18 mm long, once or twice divided into filiform lobes, sparsely denticulate. Fruit oblong-oval, stalked, 4-5 mm long, with 3 spines: the apical spine (6) 8-12 mm long, usually twice as long as the

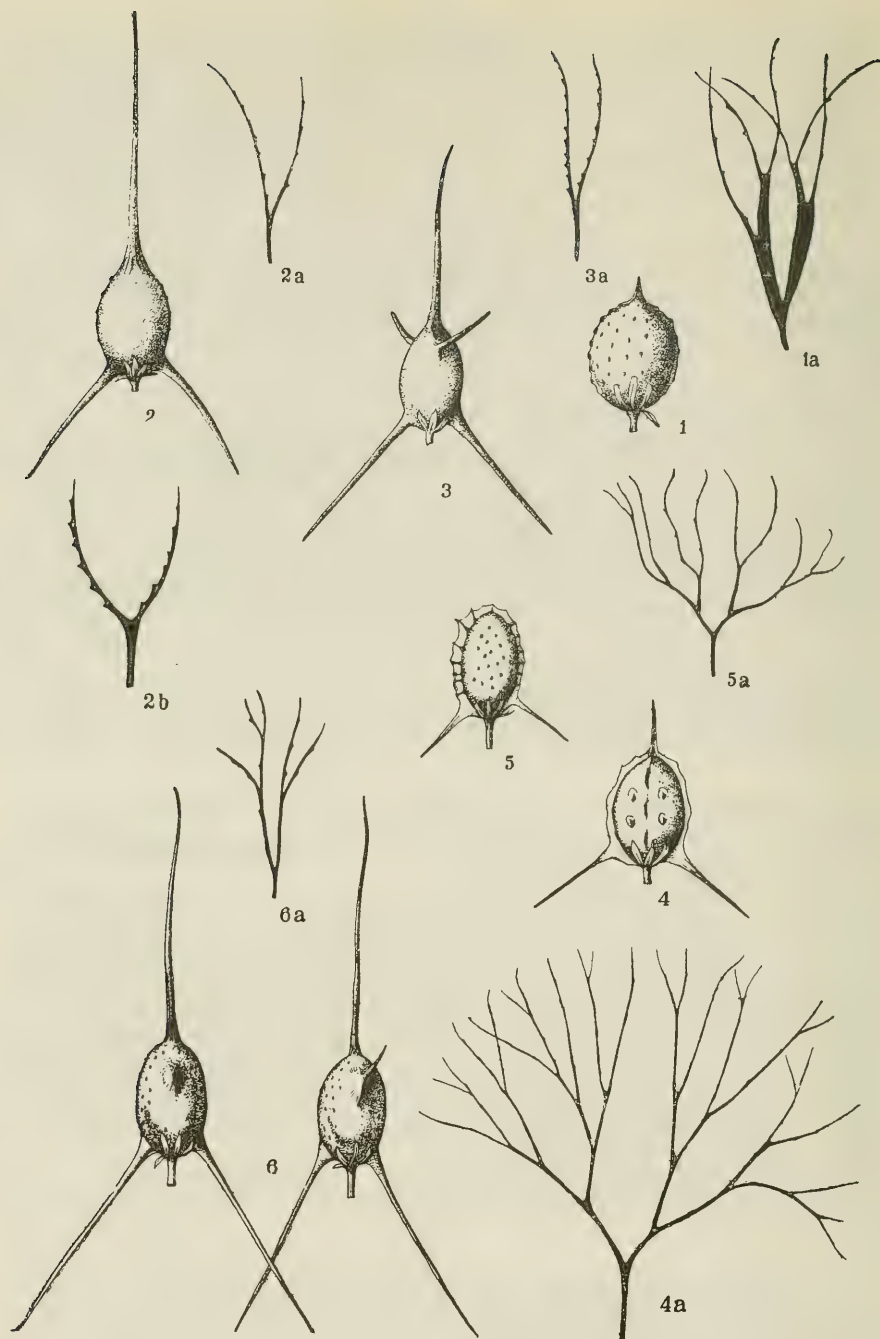


PLATE II.

1 — *Ceratophyllum submersum* L.; 2 — *C. demersum* L.; 3 — *C. oryzetorum* Kom.; 4 — *C. Kossinskyi* Kuzen; 5 — *C. tanaiticum* Sapieg.; 6 — *C. Komarovii* Kuzen.

19 fruit; the 2 basal spines shorter, slightly broadened at base, 5–7 mm long; surface of fruit uneven, with a tubercle, outgrowth, or short corniform spine slightly above the middle. July. (Plate II, Figure 6).

Ponds and lakes. — European part: Lad.-Ilm., L. Don. Endemic. Described from the vicinity of Leningrad (ponds in Pavlovo Park). Type in Leningrad.

4. *C. submersum* L., Sp. pl. ed. II (1763) 1409; Ldb., Fl. Ross. I, 123; Shmal'g., Fl. II, 441; Kryl., Fl. Zap. Sib. V, 1113. — *C. vulgare* Schleiden in Meinshausen, Fl. Ingrica (1878) 288. — *C. vulgare* γ muticum Cham. in Linnaea XI (1837) 541. — *C. muticum* Cham. in Linnaea, l.c. — *C. platyacanthum* Syreishch., Ill. Fl. Mosk. gub. II (1907) 134, non Cham. — Ic.: Rchb., lc. Fl. Germ. XXIII, tab. 31.

Perennial; stem very slender, smooth; leaves in dense whorls, light green, soft and delicate, 2–4 cm long, forked 3–4 times into filiform lobes, sparsely denticulate. Fruit sessile or subsessile, smooth (in var. *aculeatum* Lipsky covered with numerous minute prickles, 4–5(6) mm long, with a single straight apical spine much shorter than the fruit proper). June–July. (Plate II, Figure 1).

Lakes, oxbows, slow-flowing rivers, ditches. — European part: V.-Kama, U. Dnp., M. Dnp., Transv., L. V., Crim.; Caucasus: Cisc., Dag., W. Transc.; W. Siberia: Irt. (Baraba); Centr. Asia: Ar.-Casp., Balkh., Amu D., T. Sh. Gen. distr.: Centr. and Alt. Eur., W. Med., Bal. Described from Europe. Type in London.

5. *C. tanaiticum* Sapjég., Tr. Obshch. isp. prirody pri Khar'kov. univ. XXXVII (1902) 315. — Ic.: ibid. VI.

Perennial; stem very slender, 30–100 cm high; leaves in approximate dense whorls, light green, soft, 1–1.5 cm long, 3–4 times dichotomously divided into 8–16 thin delicate lobes, their upper parts with small scarcely discernible spineless denticles. Fruit oval, flattened, 3–5 mm long, borne on a stalk almost half as long as the fruit (1–2 mm), dentate-margined, conspicuously winged; well-developed spines wanting, but often 2 proximal teeth longer than the others though not more than half as long as the fruit; in upper part of fruit 1 or 2 teeth usually more developed than the others, though not longer than the lower teeth; apical tooth seldom well developed; 3–4 little teeth at margin of wing. May. (Plate II, Figure 5).

Lakes. — European part: Bl., L. Don. Endemic. Described from the Lower Don area. Type in Leningrad.

6. *C. kossinskyi* Kuzen., sp. nova in Addenda VI, p. 550.

20 Perennial; stem slender, smooth, sparsely branched; leaves in whorls of 6–8, dark green, 3–4 cm long, 2–5 times forked into filiform, rarely filiform-linear, very thin lobes with minutely and sparsely denticulate margin. Fruit oblong-oval, ca. 4 mm long, 2.5 mm broad, margin narrowly winged, the uneven surface covered with small oblong or scalelike tubercles, occasionally with an additional larger elongated tubercle in upper third of dorsal axis; spines 3, not longer than fruit, slightly broadened proximally, flat, the upper spines 1.5–2.5 mm long, the lower very distant, 1.5–3.5 mm long. June–July. (Plate II, Figure 4).

Standing or slow-flowing waters. — European part: L. V. Endemic. Described from the Volga Delta. Type in Leningrad.

Family LXIII. **RANUNCULACEAE** JUSS.

Flowers zygomorphic or actinomorphic (irregular or regular), spirocyclic or in rare cases cyclic, either with calyx or with calyx and corolla, often with prominent nectaries; stamens usually numerous, distinct; gynoeceum apocarpous, carpels 1 to many, distinct, only in exceptional cases conerescent, each carpel containing 1 to many ovules with 1 or 2 integuments. The basic unit of fruit a 1- to many-seeded follicle, in one case expanding to resemble a berry; seeds with copious, oleaginous endosperm and small embryo; pollen grains binucleate or rarely trinucleate; antipodal cells often more than 3 or of larger dimensions. Between 1,200 and 1,500 species, mainly in the Temperate Zone; annuals, perennials, or even lianoid climbing plants, often rich in alkaloids and glucosides, with a pungent taste.

Dewalquea gelindenensis Sap. et Mar., from the Paleocene of L. Don (Ushi near Kamyshin), in V.-Don (Skolkovo and Toponino in the Ul'yanovsk area, Akshaut, Lysaya Gora, etc.). — *D. gelindensis* var. *dilatata* Krassn., from the Paleocene of L. Don (Ushi). — *D. grandifolia* Krassn., from the Paleocene of L. Don (Tarasovka, Ushi); V.-Don (Topornik, Yasachnaya Tashla). — *D. grandifolia* Krassn. var. *enermis* Krassn., from Paleocene of L. Don (Ushi). — *D. groenlandica* Heer, from the Paleocene of L. Don. — *D. baldemiana* Sap., from the Paleocene of L. Don (Akshaut). — *D. orientalis* Krassn., from the Paleocene of L. Don (Privol'skaya); V.-Don (Syaz River in the Ul'yanovsk area). — *D. sp.* in L. Don (Ushi); from V.-Don (Akshaut) Paleocene. *Dewalquea* is related to *Helleborus*.

Key to Genera

1. Flowers zygomorphic 2.
- + Flowers actinomorphic 3.
2. Upper sepal unlike the others, forming a hood or carina
- Genus 525. *Aconitum* L.
- + Upper sepal unlike the others, flat, with base drawn out into a spur . .
- Genus 524. *Delphinium* L.
- 21 3. Carpel with 1 ovule, forming (nutlike) follicle 4.
- + Ovary many-ovuled; fruit a many-seeded follicle or berry 19.
4. Perianth simple 5.
- + Perianth double, sepals and petals sometimes reduced to nectaries . . . 10.
5. Stem almost leafless, with a single whorl of 3 leaves or a multipartite spathe below the flower 6.
- + Stem with evenly spaced leaves 8.
6. Leaves 3-lobed, spathe of three bracts close to flower forming a kind of calyx Genus 527. *Hepatica* L.

- + Leaves pinnatisect or palmatisect; spathe remote from flower, campanulate, multipartite or of 3 occasionally 2, bracts 7.
7. Ovary and nutlet longer than the simple style; spathe usually 3-bracted Genus 526. *Anemone* L.
- + Ovary and nutlet with plumose style several times as long as themselves. Spathe campanulate, multipartite, very seldom 3-bracted Genus 528. *Pulsatilla* Mill.
8. Leaves opposite Genus 530. *Clematis* L.
- + Leaves alternate 9.
9. Leaves palmate Genus 538. *Trautvetteria* Fisch. et Mey.
- + Leaves compound Genus 539. *Thalictrum* L.
10. Leaves opposite, perianth 4-tepaled, colored, ovary and fruit with a long plumose style Genus 529. *Atragene* L.
- + Leaves alternate or all radical, perianth 5- or rarely 3-tepaled, ovary and fruit with short nonplumose style 11.
11. Calyx persistent in mature fruit. Small alpine plants with few radical ovate petiolate leaves Genus 533. *Oxygraphis* Bge.
- + Calyx deciduous after flowering 12.
12. Stamens 5-15, 2-10 cm long. Annuals with only radical leaves; receptacle elongate-cylindric 13.
- + Stamens numerous; stem usually leaved, rarely leafless; receptacle usually hemispheric, rarely cylindric 14.
13. Leaves entire, linear, sepals with basal spurs; achenes with a rostellum Genus 531. *Myosurus* L.
- + Leaves tripartite, sepals without spurs; achenes with 2 hollow proximal tubercles and an elongated corniculate beak
- Genus 532. *Ceratocephalus* Moench.
14. Petals without basal nectariferous scales; ovaries usually large, repeatedly pinnately parted into narrow lobes . . . Genus 540. *Adonis* L.
- + Petals with a basal nectariferous scale, glabrous or covered with scales 15.
- 22 15. Flowers large, white; petals 5-15. Alpine plants with glaucous pinnate leaves; seeds pendulous . . . Genus 511. *Callianthemum* C.A.M.
- + Flowers yellow or very seldom white and then small; petals usually 5, seldom more; seeds erect 16.
16. Flowers white, leaves with capilliform lobules. Aquatic plants
- Genus 536. *Batrachium* S.F. Gray.
- + Flowers yellow, leaf lobes never capilliform. Terrestrial or sometimes bog plants, very seldom aquatic 17.
17. Achenes with prominent longitudinal veins
- Genus 534. *Halerpestes* Greene.
- + Achenes smooth or tuberculate or with pricklelike excrescences, glabrous or pubescent (very seldom with a network of prominent veins) 18.
18. Sepals 3, petals 8-10, leaves entire, mostly cordate, tuberously thickened Genus 535. *Ficaria* L.
- + Usually 5 sepals and 5 petals, leaves mostly dissected, seldom entire, not cordate Genus 537. *Ranunculus* L.
19. Leaves evergreen, coriaceous, ternate or pedatipartite 20.
- + Leaves of deflorate plants dying off, sometimes coriaceous and bi- or tripinnate 21.

20. Leaves ternate, fruit pedunculate; entire plants never more than 10 cm long Genus 520. *Coptis* Salisb.
- + Leaves pedatipartite, fruit sessile; larger plants Genus 512. *Helleborus* L.
21. Small flowers in simple or branching racemes or sometimes in spike-like inflorescences, exserted stamens longer than other parts of flower 22.
- + Flowers not in racemes, often solitary, large; stamens shorter than calyx or corolla 23.
22. Pistil 1, fruit a berry; raceme short, oval Genus 521. *Actaea* L.
- + Pistils 3–8, forming follicles; racemes long Genus 522. *Cimicifuga* L.
23. Leaves entire; perianth simple, colored Genus 508. *Caltha* L.
- + Leaves divided or compound; perianth usually double, very seldom simple 24.
24. Leaves palmatipartite 25.
- + Leaves bi- or tripinnatisect 27.
25. Cauline leaves sessile and crowded into involucre below the flower; sepals 5; petals form hollow bilabiate nectaries Genus 513. *Eranthis* Salisb.
23. + Cauline leaves alternate; sepals yellow or orange or bluish; petals flat 26.
26. Sepals bluish, persistent in fruit Genus 510. *Hegemone* Bge.
- + Sepals yellow or orange, deciduous Genus 509. *Trollius* L.
27. Petals drawn out into spurs protruding downward between the sepals Genus 523. *Aquilegia* L.
- + Petals without spurs 28.
28. Flowers sometimes with leaflike sepals and 5–8 white or yellow or red petals, 2–5 cm long; filaments fused at base into a thick ring; follicles 2–3, large, fleshy; seeds lustrous Genus 507. *Paeonia* L.
- + Flower different 29.
29. Annuals 30.
- + Perennials 31.
30. Leaf lobes narrow-linear or setiform; follicles 3–10, connate to a varying degree Genus 514. *Nigella* L.
- + Leaf lobes oblong; follicles 10–20, distinct Genus 515. *Leptopyrum* Rchb.
31. Rootstock filiform, tubercled; leaf lobes flabellate; petals in the form of nectaries; follicles 2 Genus 518. *Semiaquilegia* Makino.
- + Rootstock without tubercles; follicles 2–5 32.
32. Plants forming dense mats in rock crevices and between large stones, rootstock covered with remains of dead leaves Genus 519. *Paraquilega* Drum. et Hutch.
- + Plants with slender erect stems and simple subterranean rootstock. . . 33.
33. Nectaries wanting; stems firm, 20–50 cm high; filaments dilated toward apex Genus 516. *Enemion* Raf.
- + Nectaries present; stems not firm, to 20 cm high; flowers solitary; filaments not dilated Genus 517. *Isopyrum* L.

Tribe 1. PAEONIEAE Bernh. in Linnaea VIII (1833) 452, emend. — Flowers almost always solitary, with clearly defined calyx and corolla, without nectaries; carpel walls coriaceous-fleshy; seeds with strong testa, disposed in 2 rows on each side of ventral suture of follicles; follicles very large by comparison with those of other Ranunculaceae.

24. Genus 507. **PAEONIA*** L.**

L. Gen. pl. ed. 1 (1737) 157; Sp. pl. (1753) 530.

Flowers with calyx and corolla. Calyx persistent, more or less coriaceous; sepals 5, green or reddish; petals much larger than sepals, 5 or rarely more, red, pink, white, or yellowish, erose at apex, without nectariferous scales. Stamens numerous. Pistils 1–8, inserted on a fleshy disk. Seeds large, globose or oval, lustrous, disposed along ventral suture of follicles. Perennial herbs (or shrubs, though these not found in the USSR); leaves 1, 2, or 3 times ternate, alternate; roots thickened and tuberous.

Economic importance. All peonies are successful ornamental plants and have long been used in gardens and parks. They are numerous and the many available garden varieties are mostly produced by hybridization with *P. albiflora* and bear a variety of names (*P. chinensis* Hort., etc.). Various species of peonies can be cultivated everywhere south of the latitude of Arkhangel'sk.

1. All leaf lobes entire, sometimes united at base 2.
- + Leaf lobes more or less lobulate or dissected 12.
2. Margins of leaf lobes bear very small, dense cartilaginous crenules, rough to the touch and clearly visible with a hand-lens 1. *P. albiflora* Pall.
- + Margins of leaf lobes without cartilaginous crenules, smooth or slightly undulate 3.
3. Petals yellow, yellowish, or straw-colored 4.
- + Petals purple, pink, or white (without yellow tinge) 9.
4. Leaf lobes obovate or elliptic-oblong, obtuse or with a short mucro . . . 5.
- + Leaf lobes elliptic-lanceolate, oval, or oblong, long-acuminate 6.
5. Fruit naked (plants of the Far East) *P. oreogeton* S. Moore.
- + Fruit densely pubescent, almost tomentose 2. *P. mlokosewitschi* Lomak.
6. Fruit naked 7.
- + Fruit more or less tomentose 8.
7. Leaf lobes of medium size, usually 5–10 cm, in exceptional cases up to 15 cm long 8. *P. wittmanniana* Stev.
- + Leaf lobes particularly large, to 18.5 cm long; flowers also very large 9. *P. macrophylla* Lomak.
8. Whole underside of leaf lobes covered with densely appressed hairs, gray 10. *P. tomentosa* (Lomak.) N. Busch.

* The name used for this plant by Theophrastus.

** Treatment by N.V. Shipchinskii. In view of the omission of recently described species, and because of certain deviations from the style normally used in floral descriptions, Shipchinskii's manuscript has been considerably altered by the editors. The grouping of species into series was proposed by V.L. Komarov.

- + Leaf lobes glabrous beneath or hairiness confined to veins, pale green
..... 11. *P. abchasica* Misch.
- 9. Ovaries glabrous 10.
- + Ovaries densely pilose or tomentose, mature fruit sometimes naked. . . 11.
- 10. Styles divergent with slightly recurved stigmas; filaments black-
violet in lower and white in upper part, flowers white or rarely pink;
pedicels to 7 cm long 4. *P. vernalis* Mandl.
- + Styles approximate, straight, with hamately involute stigmas; filaments
pink or yellowish; pedicels 7-16 cm long 3. *P. obovata* Maxim.
- ++ As the preceding, but flowers larger and slightly open (Sakhalin)
..... 5. *P. japonica* Miyabe et Takeda.
- 11. Ovaries tomentose with dense white or gray hairs; leaf lobes broad-
lanceolate or lanceolate, acuminate; filaments mostly reddish
..... 7. *P. caucasica* N. Schipcz.
- + Ovaries ventrally and sometimes entirely covered with dense pink
hairs (tomentum); leaf lobes ovate, obtuse, firm, subcoriaceous;
filaments yellow 6. *P. triternata* Pall.
- 12. Leaf lobes narrow-lanceolate, flowers large 12. *P. anomala* L.
- + Leaf lobes linear (rarely lance-linear) or filiform; flowers smaller. . . 13.
- 13. Flowers dark purple or bright red; leaf lobes filiform or linear;
seeds black 14.
- + Flowers pink or pink-purple; leaf lobes linear or lance-linear, seeds
dark grayish-brown 13. *P. hybrida* Pall.
- 14. Leaf lobes narrow, linear, 1-2 mm broad, glabrous above
..... 14. *P. tenuifolia* L.
- + Leaf lobes 3-10 mm broad, hispid above, along veins
..... 15. *P. biebersteiniana* Rupr.

Series I. *Chinensis* Kom. — Leaf lobes cartilaginous at margin,
denticulate, gradually acuminate.

- 26 1. *P. albiflora* Pall., Fl. Ross. II (1788) 90; Ldb., Fl. Ross. I, 74;
Turcz., Fl. baic.-dahur., I, 89; Maxim., Primit. Fl. Amur., 29; Huth in
Engler, Jahrb. (1892) 267; Kom., Fl. Manchzh. II, 224. — Ic.: Pall., l.c.,
tab. 84.

Perennial; thickened roots fusiform, grayish-brown; stems glabrous,
with 1 or several flowers, 60-100 cm or more high; leaves biternate, the
lobes petiolate or lateral lobes sessile, lanceolate or elliptic, mostly
acuminate, margin with scarcely discernible dense cartilaginous forward-
pointing crenules; some bracts divided like leaves or entire. Flowers
white or very seldom red (*v. hirta* Huth); petals 5-8 or more; stamens
golden yellow; fruitlets 3-6, at first straight, later hamately diverging;
seeds oval, black. Fl. May-June, fr. September.

Dry open stony slopes, open valleys, riverbanks, scrubland, and sparse
wood margins. — E. Siberia: Dau.; Far East: Ze.-Bu., Uss. Gen. distr.:
Mong., Jap.-Ch. Described from Transbaikalia. Type in Leningrad.

Economic note. This species has long been cultivated in gardens and
parks, for its large, beautiful flowers and its hardiness; it has many garden
forms and hybrids. It can be grown anywhere south of the latitude of
Arkhangel'sk without winter covering.

Series 2. *Obovatae* Kom. — Leaf lobes entire, more or less orbicular or oval, rarely acuminate.

2. *P. mlokosewitschi* Lomak. in Tr. Tifl. Bot. Sada II (1897) 282. — *P. Mlokosiewiczii* N. Busch in Fl. cauc. crit. III, 3 (1901) 14. — Ic.: Bot. Mag. tab. 8173.

Perennial; thickened root fusiform, grayish-brown; stems to 1 m high or sometimes even higher; leaves biternate, their lobes oblong, elongate-ovate, elongate-elliptic, ovate, or inversely short-acuminate, glaucous above with a waxy bloom, pale-colored beneath with short pubescence and indistinct veins. Flowers gaping, to 10–12 cm in diameter, yellow or pale yellow; drying petals becoming green at margins; fruits tomentose, arcuately recurved. April–May.

Rocks and open slopes in the forest zone. — Caucasus: E. Transc. Endemic. Described from Kakhetia (Lagodekhi). Type in Tbilisi.

Economic importance. This plant, with its beautiful flowers, can be recommended for cultivation in gardens and parks.

**P. oreogeton* S. Moore* in Journal Linn. Soc. XVII (1880) 376.

27 Perennial; thickened roots fusiform; leaves long-petioled, biternate, their lobes lanceolate-oval, the lateral ones subsessile, the middle lobe long-petioled; leaf blades glabrous above, appressed-pubescent or sparsely hairy beneath. Petals yellowish or straw-colored, sericeous; fruits 2–3, elongate, naked; seeds black with a dark blue sheen, more or less dull. Fl. June, fr. September.

Broadleaf forests. — Far East: Uss.?* Gen. distr.: Jap.-Ch. Described from the Mukden area. Type in London.

Note. In the Far East this species replaces *P. mlokosewitschi* Lomak. (which grows in the Caucasus), to which it is more closely related than to *P. obovata* Maxim.

3. *P. obovata* Maxim. Primit. Fl. Amur. (1859) 29; Kom., Fl. Manchzh. II (1903) 226. — Ic.: Somoku Dzusetsu, Ed. Makino, Iconogr. Pl. Nippon X (1910) tab. 22.

Perennial; thickened roots cylindric-elongate, fusiform; leaves biternate, their lobes entire, broad-ovate or oval, pubescent or glabrate beneath, the middle lobe usually long-petioled. Flowers pink; fruits 2–5, arcuately recurved; seeds blue-black, lustrous. June, fr. September.

Mixed forests and broadleaf oak and birch forests. — Far East: Ze.-Bu., Uda, Uss. Gen. distr.: Jap.-Ch. Described from the Amur River area (Kitsi village). Type in Leningrad.

4. *P. vernalis* Mandl in Külölenyemat a "Botanikai Közlemenyek" (1921) XIX, 90; Oesterr. Botan. Zeitschr. (1922) Nos. 7–9, 178, cum ic. — *P. obovata* var. *australis* N. Schipcz. in herb.

Perennial; thickened root cylindric-oblong, more than 1 cm thick; almost prostrate plants; stems ca. 7 cm high, with large basal scales and 3–4 leaves; leaves straight, longer than the flowers, lower leaves biternate, uppermost leaf tripartite; leaflets elliptic, entire, short-acuminate, pale and quite smooth beneath, dark green above. Solitary terminal flower

* Not yet found in the USSR.

on straight pedicel 1.5–7 cm long, the flower more than 9 cm in diameter, sepals elliptic, petals oblong-oval, white with a silky sheen or rarely bright pink, 3–5 cm long; stamens 1.5–2 cm long; filaments quite black-violet at base, higher up white like anthers; fruit 1–2 or sometimes to 3 cm long; seeds black-blue. May.

Broadleaf forests and shrub thickets. — Far East: Uss. Endemic (or else Jap.-Ch.: Korea and Manchuria). Described from the vicinity of Nikol'sk-Ussuriisk [now Ussuriisk]. Type in Vienna?

Economic note. A beautiful species, highly suitable for cultivation, flowering almost a month before *P. obovata* Maxim.

5. *P. japonica* Miyabe et Takeda in Gard. Chron. Ser. 3, XLIII, III (1928) 366. — *P. obovata* var. *japonica* Makino in Tokyo Bot. Mag. (1902) 59. — *P. obovata* F. Schmidt (non Maxim.) in Schmidt, Fl. Sakhalina, 117.

Perennial; very close to *P. obovata*, distinguished by its broad-oval leaflets. The not fully open white and pink flowers are more than 9 cm in diameter; its acute leaf lobes taper evenly to the apex. August.

Rivulets. — Far East: Sakh. Gen. distr.: Japan. Described from Honshu Island. Type in Tokyo.

Note. This species is still little known and has received little study; we separate it mainly on the basis of its insular habitat.

Series 3. *Corallinae* Kom. — Leaf lobes entire, rather wide, acuminate.

6. *P. triternata* Pall. in Nova Acta Acad. Petropol. X (1795) 312 (nomen nudum); Ldb., Fl. Ross. I, 73; N. Schipcz. in Not. Syst. ex Herb. H. P. II, Nos. 11 and 12, 45. — *P. corallina* ssp. *triternata* Boiss., Fl. Or. I (1867) 97 (ex parte); N. Busch in Fl. cauc. crit. III, 3 (1910) 10 (ex parte); Shmal'g., Fl. I, 31 (ex parte). — Exs.: Callier, It. taur. III (1900) No. 526.

Perennial; thickened roots carrot-shaped, sessile or borne on a short stalk; leaves biternate; leaflets rounded-ovate, obtuse, more or less coriaceous, glaucous. Flowers purple; fruit 2–5, follicles declinate or curved; covered with a pink tomentose down; seeds black-blue. May–June.

Wooded and open mountain slopes. — European part: Crim.; Caucasus: W. Transc. (Novorossisk area). Endemic. Described from the Crimea. Type in Leningrad.

7. *P. caucasica* N. Schipcz.* comb. nova. — *P. corallina* Ldb. Fl. Ross. I, 73, non Retz. — *P. corallina* var. *caucasica* N. Schipcz. in Notul. Syst. ex Horti Bot. Petrop. II (1921) 45. — *P. corallina* subsp. *triternata* N. Busch in Fl. cauc. crit. III, 3 (1901) 10, p. p. — *P. triternata* Rupr. Fl. Cauc. (1869) 44, non Pall. — Georgian: ardasalami, iordasalami., Armenian: iordasalam, brabion, khachapait, kadhvard; Turkish: abudzhah. (It is possible that these names are also applied to other species of peony; even so, they refer mainly to *P. caucasica*).

* It is unclear how this species is related to *P. kavachensis* Aznav., described from the vicinity of Vastan in the Kavak area of Turkish Armenia (Magyar Bot. Lap. XVI (1917) 7); yet owing to the lack of authentic specimens of *P. kavachensis* it is impossible to establish the identity of this species. Ed.

Perennial; thickened roots only slightly inflated, conically digitate, sessile or borne on short stalks; leaves biternate, dark green above, paler beneath, lobes wide-oval or oval-rounded, often subcordate, obtuse or sub-acute, 3–6 cm wide, entire, cuneately narrowed toward base, glabrous, often glaucous beneath owing to waxy bloom; lobes rarely coriaceous, lustrous above, hairy beneath, the two surfaces of the same color (var. *coriifolia* Rupr., l. c.). Flowers bright purple-red, though in certain cases pale; petals 3–5 cm long, filaments red; fruit divaricate, usually 5, covered with a dense white down; seeds globose, reddish at first, later lustrous black-blue; mature seeds black. May–June. (Plate III, Figure 1, a-a₁).

Forests, forest margins, forest clearings, shortgrass meadows, and shrub thickets in the forest zone at altitudes of 900–2,000 m. — Caucasus: Cisc., W., E., and S. Transc. Endemic. Described from W. Transc. Type in Leningrad.

Economic importance. In home weaving the flowers are used as a red dye for wool and paper and as a light red dye for flax and silk. Fatty oil is extracted from the seeds, which are also used for making children's necklaces.

Note. The red Transcaucasian peony was initially referred to the South European-Mediterranean species *P. corallina* Retz. (Obs. III (1783) 34) with its rather narrow oblong-elliptic leaf lobes. Boissier (Fl. Or. I 97) and N. A. Bush (see above) found it impossible to accept the independent status of the Caucasian peony. They claim there are transitional forms between *P. caucasica* and *P. corallina*. Ruprecht considered *P. caucasica* to be distinct from *P. corallina*, and included it in one species with the Crimean peony *P. triternata* Pallas.

There are reports of a hybrid *P. corallina* auct. × *P. mlokosiewiczii* Lomak. (*P. chamaeleon* Troitsky ex Grossg., Fl. Kavk. II (1930) 92).

8. *P. wittmanniana* Hartwiss ex Lindl. Bot. Reg. XXXII (1846)* No. 9; Stev. in Bull. Soc. Not. Mosc. ser. III, XII (1848) 275; Boiss., Fl. Or. I, 97; N. Busch. in Fl. cauc. crit. III, 3 (1901) 12. — *P. corallina* var. *wittmanniana* Alb. Prodr. Fl. Colch. (1895) 14. — Ic.; Annales de Gand. (1846) tab. 64. — Exs.: Fl. Cauc. exs. No. 5.

Perennial; thickened roots fusiform, grayish-brown; stems 1 m high or sometimes higher; leaves rather thin, membranous, bi- or triternate, the lobes usually obovate, and gradually tapering to a point, with entire or slightly undulate margin, covered with long curved hairs mostly glaucous beneath. Flowers yellow, yellowish, or yellowish white, ca. 8 cm in diameter; filaments dark in their lower part, anthers light yellow, arcuately recurved; fruit naked, seeds black-azure. April, May–June. (Plate III, Figure 3).

Mountain forests, forest margins, scrubland, forest clearings, in both the forest and subalpine zones. — Caucasus: W., E., and S. Transc. **Gen. distr.:** Iran, Arm.-Kurd. Described from Georgia (Atskur). Type in London.

Economic importance. With its large beautiful flowers and luxuriant growth this species is very suitable for gardens and parks. In Leningrad it flowers profusely and winters without covering.

* This plant was first mentioned from Abkhazia as the "yellow-flowered peony" by Fischer in Hooker's London Journ. of Bot. (1842) 207.



PLATE III. 1. *Paeonia caucasica* N. Schipcz., leaf, a) flower, not fully open, b) and c) fruit.—
 2. *P. anomala* L., leaf.— 3. *P. wittmanniana* Stev., fruit.— 4. *P. tomentosa* (Lomak.) N. Busch, fruit.

9. *P. macrophylla* Lomak. in Tr. Tifl. Bot. Sada II (1897) 282; Lipskii, Fl. Kavk. 213. — *P. corallina* var. *wittmanniana* f. *macrophylla* Albov in Tr. Tifl. Bot. Sada I (1895), appendix 1, 15. — *P. wittmanniana* f. *macrophylla* N. Busch in Fl. cauc. crit. III, 3 (1901) 13; Grossg., Fl. Kavk. II, 91 (pro var.).

Perennial; all plants larger than related species, leaves very large, their lobes elliptic-lanceolate, oval, oval-rounded, oboval-rounded, or suborbicular, 15–24 cm long and 10–15.5 cm wide, glaucous beneath with sparse but rather long white hairs along the prominent veins. Flowers large, white with a yellowish tinge, petals particularly large, fruit naked. April–May.

Mountain forests at 800–1,000 m. — Caucasus: W. Transc. (Adzharia). Endemic. Described from Mt. Chakvis-mta above the village of Agar on 14 August, 1893 (Albov). Type in Tbilisi.

Note. The original description of this species by Lomakin refers to live specimens cultivated in the Tiflis Botanical Garden from seeds obtained from Albov.

10. *P. tomentosa* (Lomak.) N. Busch in Fomin and Voron., Opred. rast. Kavkaza i Kryma (1919) 7; Grossg., Fl. Kavk. II, 91. — *P. wittmanniana* var. *tomentosa* Lomak. in Tr. Tifl. Bot. Sada II (1897) 283; Lipskii, Fl. Kavk. 213; N. Busch in Fl. cauc. crit. III, 3 (1901) 14, pro ssp. — *P. wittmanniana* Buhse, Aufzähl. Transkauk. Pers. Pfl. (1870) 8; Boiss., Fl. Or. I (1867) 97, ex parte. — Ic.: Stapf in Bot. Mag. (1931) tab. 9249.

Perennial; leaves biternate, with elliptic, long-acuminate lobes, dark green above, pale gray beneath, with prominent veins, the entire surface densely appressed-pubescent, rather coriaceous, 6–8 cm long and 3–6 cm broad. Flowers light yellow, sepals pubescent beneath; fruit straight, densely tomentose; seeds dark blue-black. May. (Plate III, Figure 4).

Mountain forests, on rather steep stony slopes, mainly in the upper forest zone, 1,200–1,800 m above sea level. — Caucasus: Tal. Gen. distr.: Iran. Described from Mt. Nadus-Galasi. Type in Tbilisi.

Note. Lomakin collected the type specimen with immature fruits on 17 June. Subsequent observations in the Tiflis Botanical Garden convinced him that the flowers are almost identical with those of *P. wittmanniana* Stev.

11. *P. abchasica* Misch. in Grossg., Fl. Kavk. II (1930) 92.

Perennial; leaf lobes glabrous beneath or with sparse hairs along veins, narrower than in *P. wittmanniana*, 17–18 cm long and 10 cm broad, with long-attenuate tips (rarely without), dark green above, paler beneath but not gray as in *P. tomentosa*. Flowers yellow, petals ca. 5 cm long, filaments purple, fruits densely tomentose. May.

Mountain forests. — Caucasus: W. Transc. Endemic. Described from Abkhazia. Habitat of type unknown.

Note. This species has not yet been thoroughly studied.

Series 4. *Dentatae* Kom. — Leaf lobes incised or with dentate margin.

12. *P. anomala* L., Mant. II (1771) 247; Ldb., Fl. Ross. I, 74; Kryl., Fl. Zap. Sib. V, 1116. — *P. laciniata* Pall., Fl. Ross. II (1788)

93. — *P. sibirica* Pall., *ibid.* — Ic.: Pall., l.c., tab. LXXXV; Bot. Mag. 42 (1815) tab. 1754. Russian name: pion Mar'in-koren'; Tataric: cheгна, shegnya.

Perennial; thickened roots large, fusiform, subsessile; stems mostly 1-flowered, 60–100 cm or even higher; leaves biternate, leaflets deeply or pinnately dissected, middle segments mostly 3-lobuled, lateral lobes lanceolate with elongate tips, entire, to 2.5 cm broad; leaflets glabrous beneath, with scarcely discernible dense hairs along the depressed principal veins. Flowers purple-pink, 8–13 cm in diameter; petals erose-tipped; carpels 5, naked (var. *nudicarpa* Huth) or pubescent (var. *typica* Huth), horizontally divergent; seeds black. End of May, June. (Plate III, Figure 2)

Forest margins and clearings, forest meadows; in the wild, confined to the forest zone. — European part: Dv.-Pech., V.-Kama, Transv.; W. Siberia: Ob, Alt.; E. Siberia: Yenis., Lena-Kol., Ang.-Say.; Centr. Asia: Dzu.-Tarb., T. Sh. **Gen. distr.:** Dzu.-Kash., Mong. Described from Siberia. Type in London.

Economic importance. On account of its high resistance to low temperatures and its large, beautiful flowers, *P. anomala* is suitable for use as an ornamental plant in gardens and parks everywhere south of the Arctic Circle. Formerly large quantities of the roots were dried and stored to be cooked with meat by the population of West Siberia.

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13. *P. hybrida* Pall., Fl. Ross. II (1788) 94; Ldb., Fl. Ross, I, 73; Kryl., Fl. Zap. Sib. V, 1117. — *P. intermedia* C.A.M., in Ldb., Fl. Alt. II (1830) 277. — *P. hybrida* α *typica* et β *intermedia* Kryl., Fl. Alt. (1901) 47. — Ic.: Pall., Fl. Ross. II (1788) tab. 86. — Russian names: stepnoi [steppe] pion, sobachniki; Kazak: chau-chumuldyk.

Perennial; thickened roots large, short, subsessile; stems 1-flowered, 15–50 cm high, glabrous; leaves glabrous beneath, with scarcely discernible dense hairs above along the principal veins, biternate; leaf lobes tripartite or pinnately parted into lobules, lobules usually pendent (rarely not pendent), linear or lance-linear, 3–10 mm broad, acuminate or obtuse. Flowers purple, 6–8 cm in diameter; carpels 3 or 2, densely tomentose, declinate; seeds black-brown. May–June.

Steppe meadows, open herb-covered or stony slopes of hills and coniform mountains. — W. Siberia: Irt., Alt.; Centr. Asia: Dzu.-Tarb., Pam.-Al., T. Sh. **Gen. distr.:** Dzu.-Kash. Described from the vicinity of Barnaul. Type in London.

Economic importance. Formerly in Kazakhstan a kind of gruel was prepared by boiling the roots in milk or water. Used ornamentally like other peonies.

Note. There are two varieties: 1) var. *typica* Kryl. — leaf lobules linear, 3–5 mm broad, usually pendent; stems 15–30 cm high, root cones large, short; 2) var. *intermedia* (C.A.M.) Kryl. — leaf lobules lance-linear, 4–10 mm broad, not pendent, stems to 50 cm high, often ascending, root cones elongated. The leaves of this second variety bring the species close to *P. anomala*, but seed color, manner of growth, and distribution in mountain-steppe areas, though not in forests, make it necessary to assign it to *P. hybrida*.

Series 5. Fissae Kom. — Leaves biternate, triternate or pinnate, multifid, with narrow lobes.

14. *P. tenuifolia* L., Sp. pl. ed. 2 (1762) 748; Ldb., Fl. Ross. 1, 73; Shmal'g., Fl. 1, 32; N. Busch in Fl. cauc. crit. III, 3 (1901) 7. — Ic.: Rchb., Ic. Fl. Germ. f. 4740; Bot. Mag. XXIV (1806) tab. 926. — Exs.: Callier, Iter taur. III, No. 770; HFR No. 652; Fl. Cauc. exs. No. 35.

35 Perennial; rootstocks with oblong root cones on short stalks; stem simple, 1 or rarely 2-flowered, glabrous, 10–50 cm high; leaves biternate, triternate, or ternately pinnate, dissected into linear or linear-filiform entire lobes 1–2 mm broad, pendent and divergent at margins. Flowers to 8 cm in diameter; petals 8–10, bright red or dark purple; filaments purple, anthers yellow; fruit consisting of 2–3 or rarely 4–5 straight or slightly curved-declinate carpels densely covered by grayish brown-purple hairs; seeds elongate-rounded, black-brown, lustrous. April–May.

Steppes, steppe slopes, and scrubland. — European part: M. Dnp., V.-Don, Transv., Bl., Crim., L. Don, L.V.; Caucasus: Cisc. **Gen. distr.:** Centr. Eur., Bal.-As. Min. Described from the Ukraine. Type in London.

Economic importance. A very attractive plant when in flower, deserving widespread utilization in gardens and parks. Can be cultivated without winter covering, as far north as the latitude of Leningrad.

15. *P. biebersteiniana* Rupr., Fl. Cauc. (1869) 47, 288; Lipskii, Fl. Kavk., 214. — *P. tenuifolia* β *hybrida* Lipsky, Fl. Ciscaucasica (1889–1892) 235. — *P. tenuifolia* var. *Biebersteiniana* N. Busch in Fl. cauc. crit. III, 3 (1901) 9; Grossg., Fl. Kavk. II, 91.

Perennial; stems and leaves resemble those of *P. tenuifolia*, but leaf lobules 3–10 cm broad, veins with very prominent rows of hairs on upper surface. Flowers bright red, fruit pubescent. May.

Steppes and steppe slopes, sometimes among shrubs. — Caucasus: Cisc. Endemic. Described from the vicinity of Stavropol. Type in Leningrad.

Recently, a provisional recommendation was made to introduce the arborescent Chinese peony *P. moutan* Sims., Bot. Mag. tab. 1154 (*P. arborea*) into large-scale park-and-garden cultivation in the southern USSR. It could certainly be rapidly propagated in gardens along the south coast of the Crimea and in the Caucasus.

Tribe 2. **HELLEBOREAE** DC. Syst. I (1818) 130, 306. — Flowers solitary or in racemes, carpel walls thin, rarely fleshy; mature follicles many-seeded, dehiscent, rarely a berry (*Actaea*) or capsule, in only one case (*Callianthemum*) 1-seeded and indehiscent.

Genus 508. **CALTHA** * L. **

L. Sp. pl. (1753) 558.

Perianth simple, corollaceous, with 5 (or more) yellow or white tepals. Stamens and carpels numerous, inserted on a flat receptacle. Carpel

* Name of a yellow flower, used by the Roman authors Virgil and Pliny.

** Treatment by Shipchinskii.

unilocular, with many ovules. Fruit of 2-5-12 or more follicles, dehiscing along ventral suture. Perennial herbs with entire or slightly lobed alternate leaves.

1. Flowers white, leaves with entire or slightly undulate margin. Plants growing mostly in water; stem submerged or emerging from the water 1. *C. natans* Pall.
- 36 + Flowers yellow, leaves more or less dentate or rarely entire. Bog or boggy-meadow plants or, if growing in water, the stem and leaves rising above the water 2.
2. Very small plant, not more than 8 cm high; stems not more than 1 mm thick, blades almost spatulate, not more than 8 mm long, sepals not more than 4 mm long; fruitlets 3 mm long 2. *C. caespitosa* N. Schipcz.
- + Closely resembling preceding species, but leaves generally reniform or orbicular 3. *C. arctica* R. Br.
- ++ Generally larger plants with thicker stems; flowers more than 1 cm in diameter; fruitlets at least 5 mm long 3.
3. Leaves thin, almost membranous; fruiting pedicels greatly elongating, sometimes reaching 20 cm 6. *C. membranacea* (Turcz.) N. Schipcz.
- + Leaves coriaceous fruiting; pedicels only slightly elongated 4.
4. Bracts approximately large, almost as large as or even larger than the radical leaves, entire margin dentate; stems and petioles hollow. 5. *C. fistulosa* N. Schipcz.
- + Bracts more or less distant, usually smaller than the radical leaves; stems and petioles not hollow 5.
5. Styles 1-1.5 mm long, declinate 4. *C. palustris* L.
- + Styles 3-4 mm long, straight 7. *C. polypetala* (Hochst.) Boiss.

Series 1. *Natantes* Kom. — Carpels numerous (to 30), flowers white, stems floating, tepals 5.

1. *C. natans* Pall., Reise III (1776) 248; Ldb., Fl. Ross. 1, 49; Turcz., Fl. baic.-dahur. 1, 62; Kom., Fl. Manchzh. II, 230; Kryl., Fl. Zap. Sib. V, 1119. — *C. baicalensis* Demid., ex Huth, Monogr. (1891) 16, non DC. — Ic.: J. G. Gmelin, Fl. Sibir. IV (1769) tab. 82.

Perennial; stems smooth, floating (*f. natans* Schipcz.), ascending from root growing in the bottom mud or creeping on "mochezhiny,"* rooting at the nodes (*f. limosa* Schipcz.); leaves alternate, cordate-reniform, entire obtusely dentate; sepals white, sometimes reddish- or slightly grayish-brownish margin, oval, not more than 5 mm long; follicles 20-30, clustered in a globose head, ca. 4 mm long, smooth, with a short straight rostellum. June.

- 37 Growing submerged or semisubmerged in lakes, rivers, oxbows, ponds, rivulets and bogs, or prostrate on wet or damp soil, on "mochezhiny," in river valleys and on the shores of water bodies. — W. Siberia: U. Tob. (village of Vozdvizhenka and near Antonovskoe, in the region of Irbit and

* [Land permanently wet from outflow of underground water.]

Shadrinsk), Ob (along the Tavda River); E. Siberia: Ang.-Say., Yenisei, Lena-Kol., Dau.; Far East: Kamch., Okh., Ze.-Bu., Uda, Uss. **Gen. distr.:** Mong., Jap.-Ch., N. Am. Described from the Yenisei River and Lake Baikal. Type in London.

Series 2. *Palustres* Kom. — Carpels not exceeding 12, flowers bright yellow, stems aerial, perianth (calyx) of 5 [tepals] sepals.

2. *C. caespitosa* N. Schipcz. in Not. Syst. ex Herb. Horti Petrop. II, Nos. 43 and 43 (1921) 165.

Perennial; a very small plant, not more than 8 cm high, growing on moss-covered ground; stems slender, glabrous, sometimes greatly extended and rooting at the nodes (f. *natan s* Tolm.), not more than 1 mm thick, simple, few-leaved; (including radical) 2–4, spatulate-rhombic or spatulate or spatulate-hastate, with 2–3 small notches at margin; petioles to 4 cm long, blades to 7 mm long and 8 mm broad. Flowers gaping, very small (especially in f. *natan s* Tolm.); sepals to 4 mm long, narrow, oval, caducous; stamens to 2.5 mm long; anthers few, small, gradually passing into a rostellum, total length 3 mm. July.

Silty-sandy shallows and in the tundra on edges of "laidy"*.— Arctic: Nov. Z., Arc. Sib. Endemic. Described from the vicinity of Malye Karmakuly (R. Pole, 1904), also known from Sibiryakov Island in Yenisei Gulf and from the Taimyr Peninsula. Type in Leningrad.

3. *C. arctica* R. Br., Suppl. Append. cap. Parry's voyage: A List of plants in Melv. isl. (1824) 265; A. Tolmachev in Tr. Polyarn. Kom., no. 8, p. 120.

Perennial; stems curving, 3–8 cm long, decumbent, smooth, slender; petioles short, 4–5 times as long as the blades; leaves reniform or orbicular, with entire or slightly undulate margin, 0.5–1 cm in diameter; single terminal flower to 1 cm in diameter, perianth with 5 petaloid sepals, yellow; stamens 20 or more with linear anthers, styles hamate, ovaries 15–16. June–August.

Damp peaty areas, damp low-lying areas of tundra, in Arctic tundra on "laidy" and shores of water bodies. — Arctic: Arc. Sib. **Gen. distr.:** Arctic America. Described from Melville Island in N. Am. at 76°N. lat. Type in London.

Note. In the USSR, found on Dikson Island and the Taimyr Peninsula (8 places).

4. *C. palustris* L. Sp. pl. (1753) 558; Ldb., Fl. Ross. I, 48; Turcz., Fl. baic.-dahur. I, 61; N. Busch in Fl. cauc. crit. III, 3(1901) 16; Shmal'g., Fl. I, 23; Kryl., Fl. Zap. Sib. 1119; Kom., Fl. Manchzh. II, 128. — *C. glabra* Gilib., Fl. Lith. 2 (1781) 279. — Ic.: Rch., Ic. Fl. Germ. IV (1840) tab. 101.

38 Perennial; plant more or less smooth, with roots consisting of cordlike fibrils; stems erect, ascending, or rarely decumbent and rooting at the nodes, simple or branched at the base and in inflorescence, 3–40 cm or more long; radical leaves petiolate; bracts mostly sessile, cordate-rounded,

* [Russian word: swampy northern coastal meadows flooded by exceptionally high tides.]

cordate-reniform, reniform, or even triangularly reniform-cordate, with crenate-dentate, subentire or even entire margin. Flowers mostly large, bright, golden-yellow; styles declinate, 1–1.5 mm long; follicles rather large, gradually or abruptly passing into a straight or recurved rostellum of varying length; seeds black, elongated, lustrous. April–June.

Bogs, boggy meadows, banks of rivers and other bodies of water. — Arctic: all regions; European part: all regions; Caucasus: Cisc., S. Transc.; W. Siberia: all regions; Far East: all regions; Centr. Asia: Ar.-Casp. (N.), Balkh. (N. and E.), Dzu.-Tarb. **Gen. distr.:** Scand., Centr. and Atl. Eur., Med., Bal.-As. Min., Dzu.-Kash., Mong., Jap.-Ch., Ber., N. Am., Tib. Described from Europe. Type in London.

Note. A highly polymorphic species, which can be divided into a very large number of distinct forms on the basis of differences in structure, shape and arrangement of follicles, shape and coloration of leaves and sepals, sepals, manner of branching of stems and inflorescence, manner of growth, etc.

Provisionally this species may be divided into two basic varieties, represented in the USSR: 1) flowers numerous, large (as is the whole plant), mostly golden-yellow; sepals obovate; petioles of radical leaves not more than 2–3 times as long as the blades (var. *typica* Rgl.); 2) flowers small or occasionally very small, mostly golden-yellow, sepals obovate (var. *sibirica* Rgl.). — *C. baicalensis* Demidow in DC., Syst. 1 (1818) 306. A submerged form with flowers on the surface; stems to 3 m long; described for Lad.-Ilm. under the name of var. *stebutiana* Suk. (Zhurn. Russk. Bot. Obshch. IV (1919) 111).

Economic importance. A slightly poisonous plant, containing anemonin, choline, and berberine. Unopened flower buds pickled in vinegar are known as German capers.

5. *C. fistulosa* N. Schipcz. in Notulae Syst. ex Herb. Horti Petrop. II, Nos. 42–43 (1921) 166. — *C. barthei* Koidzumi, Florae Symbolae Or.-Asiat. (1930) 77. — *C. palustris* var. *Barthei* Hance, Annal. Sc. Nat. Ser. 5, vol. V (1866) 205. — *C. palustris* f. *gigas* Levl. in Fedde Repert. VII (1909) 102.

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Perennial; smooth plant with roots of cordlike fibrils; stems erect, to 1.5 cm thick; stems to 50 cm or more high, simple or branched only in inflorescence, stems and petioles hollow; radical leaves with long petioles, auricles of sessile bracts embrace stems, those of radical leaves and bracts converge and even overlap, whole margin of blade serrate- or crenate-dentate; bracts usually not smaller than the radical leaves, approximate and forming a sort of involucre. Inflorescence many-flowered, dense; large flowers borne on rather short pedicels elongating somewhat in fruit; sepals obovate or slightly elongated, to 3 cm long and 2 cm broad, yellow; stamens 1 cm long, filaments filiform, slightly membranously dilated, anthers yellow; follicles numerous, with ovary passing gradually into a rostellum. June. (Plate IV, Figure 1).

Bogs, banks of rivers, rivulets, and other water bodies. — Arctic: Chuk.; Far East: Sakh. **Gen. distr.:** Jap.-Ch. (Sakhalin and Japan). Described from Sakhalin and Japan. Type in Leningrad.

6. *C. membranacea* (Turcz.) N. Schipcz. in Notulae Syst. ex Herb. Horti Petropol. II, Nos. 42 and 43 (1921) 168. — *C. palustris* Y.



PLATE IV.

1 - *Caltha fistulosa* N. Schipcz., flower; 2 - *C. membranacea* (Turcz.) N. Schipcz.

membranacea Turcz., Fl. baic.-dahur. I (1842) 62; Rgl., Plantae Raddeanae, 55; Huth, Monogr. in Helios (1891) 19.

Perennial; smooth plants with roots of cordlike fibrils; stems erect or declinate, not firm, to 50 cm or more high, simple or branched in inflorescence; petioles of radical leaves to 35 cm long; bracts with short petioles or subsessile; leaf blades reniform or rounded-reniform, thin, submembranous, with entire margin usually coarsely dentate; leaf auricles not converging, leaving a rather wide notch; blades sometimes with deep lateral recesses which extend from margin almost to center of blade, rendering leaves quasi-ternate. Inflorescence of 1–6 flowers borne on slender, very long pedicels, which vary greatly in length even in the same plant, reaching 20 cm and even more in fruit; flowers small, sepals to 1 cm long, rarely longer, elongate-obovate, almost sulfur-yellow; flowers of some specimens with overall diameter ca. 1 cm; stamens to 8 mm long; follicles to 6–7, usually not less than 2–4, rarely more, slightly curved but with straight dorsal wall more or less gradually passing into a 1–1.5 mm-long rostellum; overall length reaches 1 cm. June. (Plate IV, Figure 2).

Bogs, damp places, stony stream beds, banks of rivers and springs. — E. Siberia: Ang.-Say., Dau.; Far East: Kamch., Ze.-Bu., Uda. Gen. distr.: Jap.-Ch., Ber. Described from the Shilka River. Type in Leningrad.

Series 3. **Longirostres** Kom. — Carpels 5–12, flowers yellow; stems aerial, sepals 5–10, styles straight, to 4 mm long.

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7. **C. polypetala** Hochst. in Lorent. Wander. (1845) 339 (partim); Boiss., Fl. Or. Suppl. (1888) 15; N. Busch in Fl. cauc. crit. III, 3 (1901) 17. — *C. palustris* var. *polypetala* Huth, Monogr. in Helios (1891) 71. — *C. orthorhyncha* Rupr., Fl. Cauc. (1869) 28, 287. — Ic.: E. Regel, Gartenflora (1874) 259, tab. 806. — Exs.: Fl. Cauc. exs., No. 132.

Perennial; closely related to *C. palustris* L., but margins of leaves with large rounded or not rounded teeth; sepals usually 5–7–10, elliptic or oval; styles (with rostellum) 3–4 mm long, straight. April–June.

Damp places in the alpine and subalpine zones of mountains, at 1,800–2,800 m. — Caucasus: Cisc., W., E., and S. Transc. Gen. distr.: Arm.-Kurd., Iran. (N.). Described from the vicinity of Erzerum.

Economic importance. All of these plants have a strong, bitter taste and are poisonous; buds and flowers are collected and dried, to be used in winter as a condiment for soups. In addition, meal is obtained by grinding the boiled and dried roots and adding to bread.

Genus 509. **TROLLIUS*** L.**

L. Sp. pl. (1753) 556; Huth in Helios (1892) 7.

Perianth double, corollaceous, with 5 or more petaloid yellow or orange sepals which are abscised after flowering. Nectariferous organs of indefinite

* From the German Trollblume, i.e., troll-flower.

** Treatment by Shipchinskii.

number, usually many (5-20), rather short, as long as or longer than the petaloid sepals, narrow linear or more or less broadened, with a nectar-pit near the base. Stamens and pistils numerous, inserted on a convex receptacle. Carpel unilocular with many ovules. Fruit an indefinite number of follicles (mostly numerous) which dehisce along ventral suture. Seeds black, mostly lustrous, oval. Perennial herbs with alternate leaves.

Economic importance. All species of the genus *Trollius* have large, bright flowers and are therefore eminently suitable for ornamental use in gardens and parks. They have long been cultivated, and there is available a series of garden forms distinguished by enlarged flowers, double-flowered forms, and various shades of coloration. All species hybridize easily, and when several species are cultivated in close proximity in gardens and parks, it is almost impossible to obtain "pure" seeds.

Note. In certain cases it is rather difficult to determine the species of *Trollius*, since exact identification is only possible when flowers and mature fruits are available.

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- 1. Rostellum of pistil and fruit very slender and long, as long as the ovary proper. Petal-nectaries very small, half as long as the stamens, broad, ovate-cuneate or almost spatulate-obovate, to 4 mm long and 2 mm broad; sepals very thin, pale, at upper margin erose.
..... 11. *T. chartosepalus* N. Schipcz.
- + Rostellum of pistil and fruit not slender, shorter than the ovary proper. Petal-nectaries narrow, more or less linear, if shorter than stamens then only slightly so; sepals not thin, more or less entire . . . 2.
- 2. Flowers globose, closed owing to overlapping of the margins of the intricate sepals, hence stamens, petals, and ovaries not visible at flowering 3. *T. europaeus* L.
- + Flowers more or less flat, else globose and then sepals not overlapping distally, divergent, leaving a free passage to the inner organs which are clearly visible at flowering 3.
- 3. Petal-nectaries 4-5 mm long, not larger than stamens, thickened at apex; total length of follicles below the hamately-recurved rostellum not more than 9 mm, with a membranous border along the suture . . .
..... 9. *T. riederianus* Fisch. et Mey.
- + Petal-nectaries as long as or longer than stamens (not less than 6 mm long), not thickened toward apex; total length of follicles not less than 9 mm without membranous border 4.
- 4. Petal-nectaries about twice as long as sepals, to 3 cm, gradually and slenderly acuminate; at maturity rostellum ca. 5 mm long
..... 5. *T. chinensis* Bge.
- + Petal-nectaries not longer than sepals, or else slightly longer and then not acuminate but rounded at apex; at maturity rostellum not more than 3 mm long 5.
- 5. Petal-nectaries broadening gradually toward apex (to 15 mm long and 4 mm broad), orange-colored, almost as long as sepals; rostellum very short, always strongly incurved 8. *T. asiaticus* L.
- + Petal-nectaries linear, not broadening toward apex, (less than 4 mm broad); rostellum at most insignificantly incurved 6.
- 6. Stigmas purple 2. *T. altaicus* C.A.M.

- + Stigmas yellow or greenish 7.
- 7. Leaves little dissected, more or less coriaceous; lobes broad with shallow incisions; petal-nectaries often abruptly broadened distally 1. *T. dschungaricus* Rgl.
- + Leaves deeply dissected into broad rhombic deeply incised lobes; petal-nectaries never abruptly broadened at apex 8.
- 44 8. Petal-nectaries not less than 15 mm long; at maturity rostellum not longer than 1.5 mm 6. *T. ledebouri* Rchb.
- + Petal-nectaries not longer than 10 mm; at maturity rostellum not less than 2 mm long 9.
- 9. Petal-nectaries longer than stamens; at maturity rostellum ca. 2 mm long, somewhat incurved . . . 7. *T. sibiricus* (Rgl. et Til.) N. Schipcz.
- + Petal-nectaries shorter than or as long as filaments; at maturity rostellum not less than 2.5 mm long, straight or curved outward . . . 10.
- 10. Total length of follicle 4–5 mm, rostellum one-third as long as ovary (plant from the Caucasus) 4. *T. patulus* Salisb.
- + Total length of follicle not more than 3 mm, rostellum one-fourth as long as ovary (plant from the Far East) 10. *T. japonicus* Miq.

Section 1. **EUTROLIUS** Prantl in Engler u. Prantl Pflanzenf. III, 2 (1891) 56. — Flowers yellow, orange, or almost white.

1. *T. dschungaricus* Rgl. in A.H.P. VII(1880)8383. — *T. europaeus* γ songoricus Rgl. in Bull. Soc. Nat. Mosc. XLIII, 1 (1870) 243.

Perennial; stem erect or rarely very slightly suberect, simple or rarely slightly branched, 5–60 cm high, elongating slightly in fruit, 1–3-flowered, smooth, base covered with remnants of previous year's leaves; radical leaves petiolate, palmately 5-lobed, the lobes broad, obovate, slightly incised into 3 lobules obtusely and broadly dentate at the margins; cauline leaves 2–4, the lower petiolate, the upper sessile, the blade identical with the blade of radical leaves or somewhat more dissected, decreasing slightly in size toward the apex; pedicels 2–15 cm long, slightly elongating in fruit. Flowers ca. 10 (4–20), large, to 6 cm in diameter; sepals bright golden yellow, often reddish on the outside, ovate or obovate; sepals several times as long as petal-nectaries, these ca. 8 mm long, orange, about as long as the filaments, linear, rounded and sometimes broadened and slightly thickened at apex; petals somewhat narrowed below the nectar-pit borne at a height of ca. 1 mm; stigmas yellow, at flowering ovary rugose at base of rostellum; fruit of numerous follicles forming a globose head, total length of follicles ca. 10 mm; rostellum ca. 2 mm long, straight, inclined slightly outward; seeds black-brown, lustrous, globose, very slightly angular. June. (Plate V, Figure 2, a–e).

Mountains in the zone of alpine meadows, coniferous and broadleaf forests, to 3,800 m. — Centr. Asia: Dzu.-Tarb., Pam.-Al., T. Sh. **Gen. distr.:** Dzu.-Kash. Described from specimens grown in the Leningrad Botanical Garden from seeds collected by A. Regel in Central Asia. Type in Leningrad.

2. *T. altaicus* C.A.M. in Verz. Pflanz. Caucas. (1831) 200 in adnot.; Ldb., Fl. Ross. I, 50; Kryl., Fl. Zap. Sib. V, 1112. — *T. caucasicus*

C.A.M. in Ldb., Fl. Alt. II (1830) 301, non Stev.— Ic.: Ldb., Fl. Ross. IV, tab. 345.

Perennial; stem erect, simple or rarely slightly branched, 15–75 cm high, elongating in fruit, with 1, 2, rarely more flowers, smooth, base covered with remnants of previous year's leaves; radical leaves 2–5, lower cauline leaves mostly short-petiolate; upper sessile, or all cauline leaves sessile; blades of cauline leaves identical with those of radical leaves, or else blades of upper leaves less dissected, reduced; pedicels 1–12 cm, mostly elongating in fruit, sometimes to 25 cm. Flowers 10–20, large, to 4 cm in diameter; sepals orange or golden yellow, sometimes reddish on the outside, broad-ovate; petal-nectaries ca. 11 mm long, orange, about as long as or very slightly longer than the filaments but not longer than the stamens, about half as long as the sepals, linear, rounded at apex; nectar-pit at a height of 2–2.5 mm, below which petals gradually taper toward base; anthers purple, ovary without wrinkles at base of rostellum, smooth; fruit of numerous follicles forming a globose head, total length of follicles 12–15 mm; rostellum ca. 3 mm long, more or less inclined outward at its base and slightly hamately incurved; seeds black, dull-lustrous, very finely faceted. June–July.

Mountains in the alpine zone and upper part of forest zone and mountain meadows at 900–1,200 m. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb., Pam.—Al., T. Sh. **Gen. distr.:** Dzu.-Kash., Mong. (W.). Described from Altai. Type in Leningrad.

Note. This plant varies greatly in its vegetative parts, particularly in its leaves, and sometimes resembles *T. dschungaricus*. It appears that hybrids between *T. altaicus* and *T. dschungaricus* are occasionally encountered (Dzharkent District, Karkara River valley). Hybrids between *T. altaicus* and *T. asiaticus* have been found outside the USSR in the Tanna-Tuva Republic.*

Economic importance. A very suitable ornamental plant for gardens and parks, apparently resistant to extreme temperature fluctuations. May be cultivated without winter covering as far north as Leningrad, inclusive.

3. *T. europaeus* L., Sp. pl. (1753) 556; Ldb., Fl. Ross. I, 49; Shmal'g., Fl. I, 24; Kryl., Fl. Zap. Sib. V, 1120.— Ic.: Syreishch., Ill. Fl. Mosk. gub. II (1907) 137.— Exs.: HFR No. 902.

46 Perennial; stem erect, simple or rarely slightly branched, 15–90 cm high, elongating considerably in fruit, with 1, rarely to 5 flowers, smooth, base covered with remnants of previous year's leaves; radical leaves petiolate, palmately 5-parted, with rhombic abruptly dentate-incised lobes; cauline leaves 3–7, the lower petiolate or sessile, the upper sessile with blades becoming smaller toward apex; pedicels 3–15 cm long, considerably elongating (to 30 cm) in fruit, oblong-sulcate. Flowers large, to 5 cm in diameter, globose, all internal parts obscured by the sepals; sepals strongly concave and slightly declinate, 10–20 pale yellow or rarely golden yellow, broad, oval; petal-nectaries ca. 7 mm long, orange, slightly shorter than stamens, narrow, sublinear, very slightly broadening toward apex; nectar-pit at a height of ca. 2 mm where petal is very slightly broadened; petal tapering toward base; fruit of numerous follicles clustered in a globose

* [Since 1944, the Tuva Autonomous Region, USSR.]

head, total length of follicles ca. 10 mm; rostellum ca. 1 mm long, abruptly incurved, subappressed to suture of follicle. May-June.

Forests, forest clearings, meadows, and isolated stands in steppe, wood margins, scrubland. — Arctic: Arc. Eur.; European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. Dnp., M. Dnp., V.-Don, Transv., Bl., L. Don; W. Siberia: Ob (W.). **Gen. distr.:** Scand., Centr. and Atl. Eur., Med., Bal.-As. Min. Described from Europe. Type in London.

4. *T. patulus* Salisb., in Trans. Linn. Soc. (VIII (1807) 303; Ldb., Fl. Ross. I, 50; N. Busch in Fl. cauc. crit. III, 3, 18. — *T. caucasicus* Stev. in Mem. Soc. Nat. Mosc. III (1812) 266 (partim). — *T. somcheticus* C. Koch in Linnaea XV (1841) 247. — Ic.: Deless. Ic.: Pl. I (1820) tab. 44. — Exs.: HFR no. 1702; Fl. cauc. exs. no. 105.

Perennial; stem erect, simple or rarely slightly branched, to 35 cm high, with 1, rarely to 4 flowers, smooth, base covered with remnants of previous year's leaves; radical leaves long-petioled, palmately 5-parted into rhombic or elongate-rhombic tripartite lobes, deeply dentate-margined (sometimes dissected into lobes to 3 mm broad — var. *tenuisectus* N. Busch); cauline leaves, excluding uppermost bracts, either absent or 1, mostly sessile, its blade usually smaller than the blades of radical leaves; uppermost leaves just below the flower, approximate, their blades almost as long as the blades of radical leaves, at time of flowering forming a kind of involucre; pedicels very short at flowering, much elongated in fruit. Flowers large, sepals 5–10, ovate or elliptic, golden yellow, slightly concave, distant, therefore the flowers patulous; petal-nectaries ca. 7–8 mm long, golden yellow, as long as or slightly longer than stamens, linear; nectar-pit at a height of 1–1.5 mm, below this petals tapering very slightly; fruit of 5–15 follicles clustered in a loose head, total length of follicles ca. 4–5 mm long; rostellum straight or curved outward; seeds black-brown, dull, obtusely triquetrous in cross section. May-June.

47 Alpine and subalpine zones at 1,000–2,800 m; meadows with melting snow and damp open herb-covered slopes. — Caucasus: Cisc., W. and E. Transc., Tal. **Gen. distr.:** Iran. Described from the Caucasus. Type in London.

5. *T. chinensis* Bge., in Mem. de l'Acad. de Sc. Petersb. II (1832) 77; Maxim., Prim. fl. Amur. (1859) 22. — *T. ledebouri* var. *macro-petalus* Rgl., Tent. Fl. Ussur. (1861) 8. — *T. asiaticus* var. *chinensis* Maxim., Fl. Mongol. (1889) 25. — Ic.: Bot. Mag. CXL (1914) 8565.

Perennial; stem usually branched, more or less erect, 40–150 cm high, with several flowers or rarely 1, smooth, sulcate, base covered with remnants of previous year's leaves; radical leaves usually long-petioled, palmately 3–5-parted, with rhombic dissected serrate-dentate lobes; cauline leaves 3–7, the lower petiolate, the upper sessile, blades gradually decreasing in size toward apex; pedicels 5–10 cm, slightly elongating (to 15 cm) in fruit. Flowers large, to 5 cm in diameter; sepals 5, rarely 7–10, orange, slightly concave, broad-ovate; petal-nectaries to 3 cm long, always longer and sometimes twice as long as sepals, gradually alternate and cuspidate,

2-3 mm broad, orange; nectar-pit at a height of ca. 4 mm, below this level petals abruptly narrowing; fruit of numerous follicles clustered in a head, total length of follicles ca. 14 mm long; rostellum ca. 5 mm long, curved outward at base, arcuately incurved higher up. May-June.

Fertile damp meadows, scrubland, wood margins, and clearings. — Far East: Ze.-Bu., Uss. **Gen. distr.:** Jap.-Ch. Described from N. China. Type in Leningrad.

Economic importance. Because of its flowers, *T. chinensis* is one of the most beautiful species of the genus; it can therefore be strongly recommended for gardens and parks, where it is most effective when planted in groups on large lawns, surrounded by bushes. Winters in Leningrad without covering.

6. *T. ledebouri* Rchb., Ic. crit. III (1825) 63; Ldb., Fl. Ross. I, 51; Kom., Fl. Manchzh. II, 230-232. — *T. davuricus* Turcz., Cat. baic. (1838) No. 55, nom. nud. — Ic.: Rchb., l.c., tab. 272, f. 435.

Perennial; stem erect, simple or slightly branched, to 1 m high, slightly elongating in fruit, with 1-3, rarely more flowers, smooth, sulcate, base covered with remnants of previous year's leaves; radical leaves petiolate, palmately 5-parted, with rhombic lobes dissected into serrate-dentate lobules; cauline leaves 3-5, the lower petiolate, the upper sessile, the blades gradually decreasing in size toward apex; pedicels 3-15 cm, elongating in fruit sometimes to 20 cm. Flowers large, to 5 cm in diameter, sepals 5-10, orange or yellow, slightly concave, ovate or rhombic-oval or elliptic; petal-nectaries either short, slightly longer than stamens, or else to 20 mm long, somewhat longer than the sepals, linear, rounded at apex, yellow or orange, slightly tapering above nectar-pit, which is at a height of ca. 2 mm; fruit of numerous follicles clustered in a compact head, total length of follicles ca. 8 mm long; rostellum 1-1.5 mm long, more or less straight or slightly curved outward. May-June.

Damp and boggy meadows, damp forests, shrubby areas and birchwoods, forest clearings and herb-covered slopes. — E. Siberia: Dau.; Far East: Ze.-Bu., Uss., Sakh. **Gen. distr.:** Jap.-Ch. Described from the Argun River. Type in Berlin.

Note. Plants, possibly of hybrid origin, strongly resembling *T. asiaticus* are known from Dauria. *T. ledebouri* is more characteristic of harsher climatic conditions than the previous species. Owing to the considerable variability in length of petal nectaries, the flowers may resemble either *T. chinensis* or *T. sibiricus*.

7. *T. sibiricus* (Rgl. et Til.) N. Schipcz. in Not. Syst. ex Herb. Horti Botan. Petropol. IV, 2 (1923) 11. — *T. patulus* var. *sibiricus* Rgl. et Til., Florula Ajanensis (1858) 38; Huth in Helios (1892) 11. — *T. patulus* Ldb., Fl. Ross. I, 50, ex parte; Kom., Fl. Manchzh. II, 232.

Perennial; stem erect, simple or rarely slightly branched, 10-70 cm high (smaller specimens are mostly characteristic of the far north), elongating in fruit, with 1 or rarely 2-3 flowers, smooth, slightly sulcate, base covered with remnants of previous year's leaves or naked; radical leaves petiolate, palmately 5-parted, with rhombic lobes dissected into serrate-dentate lobules; cauline leaves 2, rarely 3-4, the lower petiolate,

the upper (or all cauline leaves) sessile, with blades gradually decreasing in size toward the apex; the uppermost leaves more or less reduced; pedicels 1–15 cm, elongating in fruit, sometimes to 30 cm. Flowers 1.5–4 cm in diameter, smallest in specimens from the far north; sepals 5–12, mostly sulfur-yellow, rarely pale yellow or orange-yellow, broad-ovate or rhombic-oval; petal-nectaries shorter than stamens (to 10 mm) to very slightly longer, linear, rounded at apex, concolor with sepals or slightly brighter; nectar-pit at a height of ca. 2 mm; fruit of many or several (sometimes 2) follicles clustered in a head, total length of follicles 9–13 mm; rostellum ca. 2 mm long, curved and bent inward or outward; seeds black-brown, lustrous, slightly faceted. June.

Damp boggy meadows, shores, scrubland, forests, in both lowlands and mountains. — E. Siberia: Yenisei, Lena-Kol., Ang.-Say., Dau.; Far East: Okh., Uda. Endemic. Described from the vicinity of Ayan. Type in Leningrad.

49 Note. In those localities where *T. sibiricus* grows together with *T. asiaticus*, we observed specimens which appear to be hybrids with mixed morphological characters; the same applies, but to an even greater degree, to the region south of Lake Baikal.

8. *T. asiaticus* L., Sp. pl. (1753) 557; Ldb., Fl. Ross. I, 50; Maxim., Prim. Fl. Amur., 22; Kryl., Fl. Zap. Zib., 1121. — Ic.: Bot. Mag. VII (1793) tab. 235. — Exs.: HFR, Nos. 1203a et b.

Perennial; stem erect, simple or branched, 5–80 cm high, with 1, rarely several flowers, smooth sulcate, base covered with remnants of previous year's leaves; radical leaves petiolate, palmately 5-parted, rhombic lobes deeply cleft into unequally serrate-dentate lobules; cauline leaves 1–5, the lower petiolate, the upper sessile, with blades similar to those of radical leaves but somewhat smaller toward apex; pedicels 1–10 cm, elongating in fruit (to 15 cm). Flowers large, to 5 cm in diameter; sepals 10–20, orange-red, broadly elliptic or obovate, slightly concave; petal-nectaries 2–3 times as long as stamens, about as long as sepals, orange-red, gradually broadening from base upward, rounded at apex; nectar-pit at a height of ca. 3 mm; fruit consists of numerous follicles clustered in a compact head, total length of follicles ca. 10 mm; rostellum 0.5–1 mm long, abruptly incurved at base; seeds lustrous, black, obtusely triquetrous. May–June.

Damp meadows, forests, forest clearings, in both the forest and forest-steppe zones; also penetrating the subalpine and part of the alpine zone; in the north it also grows in the tundra. — Arctic: Arc. Sib. (W.); European part: Dv.-Pech. (E.), V.-Kama (E.); W. Siberia: ob. U. Tob. (E. slopes of the Urals), Irt., Alt.; E. Siberia: Yenisei, Lena-Kol. (between the Vilyui and Olenek rivers), Ang.-Say., Dau.; Centr. Asia: Dzu.-Tarb. Gen. distr.: Mong. Described from Siberia. Type in London.

Note. The distribution area is discontinuous: 1) the main part of the range includes a wide area extending to the Altai and Sayan mountains; 2) the smaller part includes the eastern slopes of the Urals.* *T. asiaticus* does not occur in the West Siberian Plain.

* Specimens from the Ural part of the range have been separated by B.N. Gorodkov as an independent species, *T. uralensis* Gorodk., distinguished by its petals, shape of nectaries, and manner of growth, and resembling *T. europaeus* L. This is apparently identical with *T. europaeus* var. *apertus* Perf. (1936) described by Perfil'ev in "Flora Severnogo kraya" [Flora of the Northern Territory.] *T. uralensis* was linked by Gorodkov with *T. europaeus*, but not with the Siberian species. Ed.

This species is fairly uniform in its morphological characters; only in the eastern part of the Angara-Sayan area grow divergent forms, with narrower petal-nectaries, comprising forms transitional to *T. ledebouri* Rchb., which may be hybrids with *T. ledebouri*.

Economic importance. A fine ornamental plant for gardens and parks, resistant to a harsh northern climate.

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9. *T. riederianus* Fisch. et Mey., in Index Sem. Horti Petrop. IV (1837) 48.— *T. patulus* var. *brevistylus* Rgl. et Til., Florula Ajanensis (1858) 37.— *T. patulus* var. *Riederianus* Huth in Helios (1892) 11.— *T. membranostylis* Hulten, Fl. Kamtch. II (1928) 99.

Perennial; stem simple, erect, 5–40 cm high, greatly elongating in fruit, 1-flowered, smooth, base covered with broad scarious sheaths and remnants of previous year's leaves; radical leaves petiolate, with broad scarious sheaths at base, palmately 3–5-parted, with rhombic lobes deeply cleft into unequally serrate-dentate lobules; cauline leaves 1–3, the lower usually petiolate, the upper sessile, blades resembling those of radical leaves; pedicels 0.5–5 cm, greatly elongating in fruit (to 25 cm). Flowers to 3 cm in diameter; sepals 5–10 mm; orange-yellow, broad-oval, slightly concave; petal-nectaries 5–7 mm long, as long as or shorter than stamens, orange-red, gradually broadening from nectar-pit upward, thickened and slightly spatulately broadened and rounded at apex (usual shape of petal-nectaries obpyriform), rapidly tapering below nectar-pit; the latter at a height of ca. 2 mm; fruit a loose head of numerous or few clustered follicles, total length of follicles ca. 10 mm; follicles with a scarious keel along dorsal suture, around and along the rostellum; the latter ca. 3 mm long, hamately curved outward. June.

Forest meadows and subalpine meadows.— Arctic: Chuk., An.; Far East: Kamch., Okh., Uda. Endemic. Described from Kamchatka. Type in Leningrad.

10. *T. japonicus* Miq., in Annal Mus. Bot. Lugduno-Batav. III (1867) 6.— *T. ledebouri* var. *macropetalus* Fr. Schmidt, Fl. Sachal. (1868) 113.— Ic.: Somoku Dzusetsu ed. 2, X (1874) tab. 55.

Perennial; stem erect, simple or branched, 20–65 cm high, slightly elongating in fruit, with 1 or else 2–3 flowers, smooth, base covered with remnants of previous year's leaves; radical leaves petiolate, palmately 5-parted, with rhombic lobes deeply cleft into unequally narrow-toothed thin delicate lobules; cauline leaves 1–3, the lower petiolate, the upper sessile, blades resembling those of radical leaves; pedicels at beginning of flowering 0.5–1 cm, reaching 10 cm in fruit. Flowers large, to 4 cm in diameter; sepals 5–10, bright yellow, broadly elliptic, slightly concave; petal-nectaries orange, as long as or slightly shorter than stamens, linear, rounded at apex; nectar-pit at a height of 1 mm; fruit of few follicles clustered in a head, total length of follicles reaching 14 mm; rostellum 3 mm long, straight or very slightly inclined outward. May–June.

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Meadows and meadow slopes.— Far East: Sakh. Gen. distr.: Jap.-Ch. (Japan). Described from Hokkaido Island.

11. *T. chartosepalus* N., Schipcz. in Not. Syst. ex Herb. Horti-Bot. Petrop. IV, 2 (1923) 11.

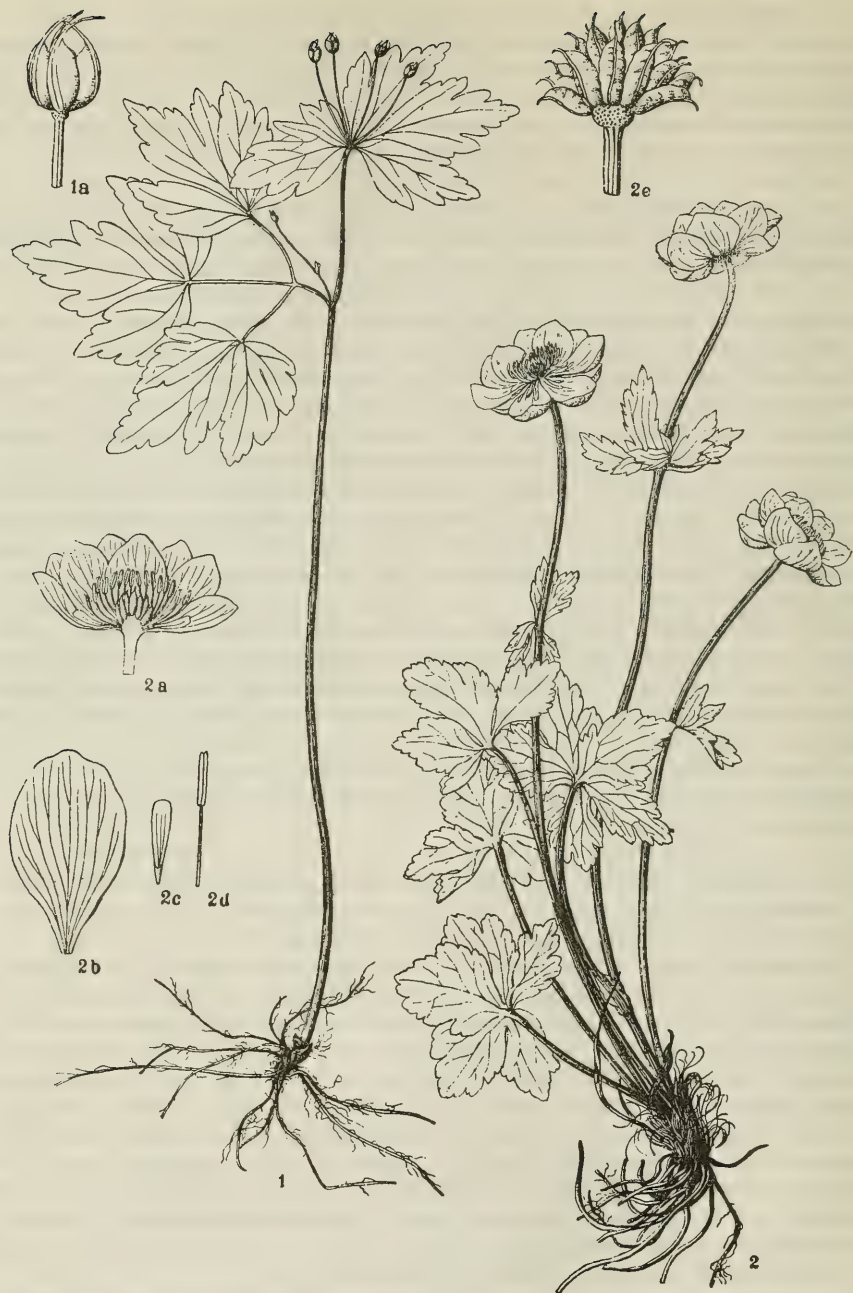


PLATE V.

1 — *Enemion raddeanum* Rgl. a) fruit; 2 — *Trollius dschungaricus* Rgl. a) flower, b) sepal, c) petal, d) stamen, e) fruit.

Perennial; stem erect, simple, 5–15 cm high, elongating in fruit to 30 cm, 1-flowered, smooth, delicate, base covered with broad scarious sheaths 1–2 mm long; radical leaves 1 or 2, petiolate, palmately 3–5-parted into broad lobes, incised and unequally dentate at margin; the single cauline leaf sessile, more deeply parted and with narrower lobes than radical leaf; cauline leaf, often also radical leaf, completing development only at end of flowering; pedicels at beginning of flowering 0.5 cm, gradually elongating to 9 cm by end of flowering. Flowers large, to 4 cm in diameter; sepals 5, pale yellow (or white?), broadly elliptic or obovate, at upper margin erose, very delicate and thin; petal-nectaries orange (?), 4 mm long, half as long as stamens, broad, spatulate or broadly obpyriform to 2 mm broad at tip; nectar-pit at a height of ca. 0.5 mm; fruit of 5–7 follicles, total length of follicles 11 mm long, at first rostellum, very slender, straight, as long as or even longer than the ovary. June.

Arctic: Chuk. (northern tributaries of the Anadyr River). Endemic. Described from the Anadyr area. Type in Leningrad.

Genus 510. **HEGEMONE*** BGE.**

Bge. in Ldb. Fl. Ross. I (1842) 51. — Section *Hegemone* Prantl in Engl. u. Prantl, *Naturl. Pflanzenf.* III, 2 (1891) 56.

Sepals 15–20, pale lilac, persistent, petals 10, much shorter than sepals and stamens, oblong, rounded at apex, with a short proximal nectariferous scale sacculle; ovary eglandulose; fruit a many-seeded follicle.

1. *H. lilacina* Bge., ex Ldb., Fl. Ross I (1842) 51; Kom. in Tr. Peterb. Obshch. estestvoisp. XXVI (1896) 67; Kryl., Fl. Alt. I, 34. — *Trollius lilacinus* Bge., Verz. Pfl. Alt. (1835) 33; Kryl.; Fl. Zap. Sib. V (1931) 1125. — Ic.: Bull. Soc. Bot. France (1904) tab. 4, f. l. — Excs.: Kar. et Kir., No. 1160.

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Perennial; stem erect or ascending, simple, 4–25 cm high, elongating in fruit with 1 terminal flower, smooth, base covered with remnants of previous year's leaf sheaths and the broad delicate leaf sheaths of the current year; radical leaves petiolate, palmately 3-parted into obovate lobes, which are deeply cleft into 2–3 shallowly incised and dentate-margined lobules; cauline leaves 2–3, petioles shorter than those of radical leaves; upper leaf sessile; cauline leaf blades less divided than radical and much smaller; pedicels ca. 1 cm at flowering, much elongating in fruit, sometimes to 13 cm. Flowers solitary, large, to 4 cm in diameter; sepals 15–20, rarely 5 (var. *micrantha* Winkl. ex Kom.) pale lilac, ovate or obovate, persistent and then dingy gray; petal-nectaries ca. 5 mm long, yellowish, proximally greenish, lance-linear, rounded at apex, as long as or slightly shorter than filaments, one-third to one-half as long as sepals; nectar-pit at a height of ca. 0.75 mm; fruit of numerous aggregated follicles, total length of follicles ca. 10 mm; rostellum ca. 2 mm, erect or very slightly inclined outward proximally, very slightly incurved higher up; seeds black, lustrous, triquetrous. June–August.

* From the Greek *hegemone*, a sovereign.

** Treatment by Shipchinskii.

Alpine zone at 2,200–3,500 m, banks of rivulets, meadows and moss-and-lichen tundra, snowy patches and near glaciers. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb., Pam.-Al., T. Sh. **Gen. distr.:** Dzu.-Kash. Described from Altai (Sailyugem and Kuraiskii ranges). Type in Leningrad.

Genus 511. **CALLIANTHEMUM** * C.A.M.**

C.A.M. in Ldb. Fl. Alt. II (1830) 336.

Flowers white or pink; sepals 5, ovate, whitish or violet. Petals 5–16, linear or broad-ovate, with golden-yellow patches and a proximal nectar-pit. Stamens numerous. Fruit of numerous nutlets dry, 1-seeded, glabrous, with very short rostellum. Perennial, with thickened roots.

1. Leaves thick, more or less succulent, subcoriaceous, blade divided, with 3–6 pairs of broad lobes. Plants as a rule with several stems 4. *C. alata* Freyn.
- + Leaves thin, more or less delicate, blade divided by 2–4 lobes dissected or cleft into more or less narrow segments. Plants with 1 or 2 stems 2.
- 55 2. Leaves fully developed by time of flowering, blades imparipinnate with 2 pairs of lobes. Flowers usually 3 or more, rarely less than 2 cm in diameter 3. *C. isopyroides* (DC.) Witasek.
- + Leaves not fully developed by time of flowering, blades with 2–4 pairs of paripinnate lobes. Flowers usually 1 or 2, rarely 3, large, not less than 2 cm in diameter 3.
3. Leaf segments long, narrow. Leaves narrowly elliptic. Flowers 2–4 cm in diameter 1. *C. angustifolium* Witasek.
- + Leaf segments short, broad. Leaves elliptic or subovate. Flowers 2–2.5 cm in diameter 2. *C. sajanense* (Rgl.) Witasek.

1. *C. angustifolium* Witasek, in Verh. der K. K. zool.-bot. Gesellsch. in Wien XLIX (1899) 336; Kryl., Fl. Zap. Sib. V, 1124. — *Ranunculus rutaefolius* Schlechtendal, Animadv. bot. in Ranuncul. I (1819) 11. non L. — *Callianthemum rutaefolium* C.A.M. in Ldb., Fl. Alt. II (1830) 336; Ldb., Fl. Ross. I, 48.

Perennial; rootstock horizontal or oblique or vertical; stems mostly solitary, simple, 6–22 cm high, longer than the leaves, green or purple, 1-flowered, radical leaves usually 2, not fully developed by time of flowering, with long petioles; leaf blades elliptic, bipinnate, with 2–4 but mostly 3 pairs of lobes; lateral lobes ovate-orbicular, tripinnate with long segments. Flowers 2–4 cm in diameter; sepals mostly pink; petals numerous, white, slightly concave, broadly or narrowly ovate or linear, rounded or emarginate at apex; fruitlets 2 mm in diameter, rugose with a short rostellum. May–June. (Plate VI, Figure 22).

At 1,500–3,500 m in alpine and subalpine meadows, on rocks and moraines, near glaciers, on banks of rivulets, on rock streams and rocky

* From the Greek *callos*, beauty, and *anthemon*, a flower.

** Treatment by Shipchinskii.

slopes.— W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb. **Gen. distr.:** Dzu.-Kash., Mong. (NW). Described from the Dzungarian Ala-Tau. Type in Vienna.

2. *C. sajanense* (Rgl.), Witasek in Verh. der K. K. zool.-bot. Gesellschaft. in Wien XLIX (1899) 338.— *C. rutaefolium* var. *saianense* Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 2 (1861) 51.— *C. rutaefolium* Turcz., Fl. baic.-dahur. I, 45 (ex parte), non Rchb. nec. C.A.M.; Ldb., Fl. Ross. I, 48; Kryl., Fl. Alt. I, 32.

56 Perennial; rootstock horizontal or oblique or vertical; stems slender, 4–35 cm high, 1- or 2-flowered, longer than the leaves; radical leaves not fully developed by time of flowering, thin, elliptic or subovate, bipinnate with broad segments. Flowers smaller than in the preceding species, 2–2.5 cm in diameter; sepals greenish or pinkish or even violet; petals white, few, ovate or orbicular, not emarginate; nutlets 2 mm in diameter, globose, rugose. May–June. (Plate VI, Figure 20).

Alpine meadows, high-mountain mossy tundras and rocks.— W. Siberia: Alt. (known only in the Kuznetsk Ala Tau, in the vicinity of the springs of the Ters River); E. Siberia: Ang.-Say., Dau. (SW). **Gen. distr.:** Mong. Described from Mt. Munku-Sardyk, at 2,000–2,850 m. Type in Leningrad.

3. *C. isopyroides* (DC.), Witasek in Verh. der K. K. zool.-bot. Gesellschaft. in Wien XLIX (1899) 341.— *Ranunculus isopyroides* DC., Syst. nat. I (1818) 238; Prodr. I, 30.— *Ranunculus anemonoides* Sievers, Briefe aus Sibirien (1796) ex Sententia Schlechtendali in Animadv. bot. 11.— *Callianthemum rutaefolium* Turcz., Fl. baic.-dahur. I, 45 (ex parte).— *C. rutaefolium* var. *anemonoides* Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 2 (1861) 51.

Perennial; rootstock vertical or rarely oblique or horizontal; stems 1 to several, 15–45 cm high, round, sulcate, not stout, mostly longer than the leaves, generally branched in their upper part; flowers 2–3-several per stem; radical leaves fully developed by time of flowering, mostly 2, with long petioles, leaf blades elliptic or ovate, imparipinnate or bipinnate [sic] with 2 pairs of lobes; leaf lobes suborbicular, the lower often petiolate, leaf segments orbicular. Flowers not more than 2 cm in diameter, white, pedicels long, slender; sepals 5, deciduous, ovate, pale-colored, membranous; petals 5–8, orbicular; nutlets oblong, narrowed at both ends, rugose, 4–5 mm long and 2.5 mm broad. May–June. (Plate VI, Figure 21).

At not very high altitudes, submontane belt, boggy valleys, lake shores, forest clearings, damp meadows and other damp habitats. E. Siberia: Ang.-Say. (E.), Dau. **Gen. distr.:** Mong. Described from Siberia. Type in Geneva.

4. *C. alatavicum* Freyn in Bull. l'Herb. Boiss. VI (1898) 882; Witasek, l.c., 345.— *C. rutaefolium* auct. florae Turkestanicae.

Perennial; rootstock vertical or oblique; stems usually numerous, 5–25 cm long, decumbent or ascending or rarely erect, mostly simple; radical leaves numerous, glabrous, glaucous, rarely fully-developed by time of flowering, more or less thick or even coriaceous, with long petioles; leaf blades narrowly elliptic, very rarely ovate, bipinnate, rarely pinnate,

57 with 3-6 pairs of leaflets; leaf lobes more or less dissected, lobes overlapping in not fully developed leaves, with very short petioles or sessile; cauline leaves 1 or 2, with very short petioles or sessile, orbicular. Flowers 2-2.5 cm in diameter; sepals 5, green or purple; petals 6-10, broad-ovate or even suborbicular; nutlets subglobose, 4 mm long and 2-5 mm broad, rugose. May-June.

Mountains at 2,100-3,500 m, upper timberline and higher, stony slopes, moraines, rocks, rock streams, alpine meadows and alpine tundras. - Centr. Asia: Dzu.-Tarb., Pam.-Al., T. Sh. Gen. distr.: Dzu.-Kash. Described from the Dzungarian Ala-Tau. Type in Vienna.

Genus 512. **HELLEBORUS*** L.**

L. Gen. pl. ed. 5 (1754) 244.

Sepals 5, petaloid, large, variously colored, persistent, squamous; petals in the form of small, usually greenish and yellow-green, tubular nectary borne on a short stalk and broadening considerably toward apex, distal part obtusely and emarginately truncate or extended into a sometimes involute lip; stamens numerous, hypogynous; fruit of 3-10 follicles, coriaceous, apocarpous or connate at base, many-seeded, dehiscing along ventral suture, crowned by a persistent occasionally colored style. Seeds elliptic or globose, covered with dentate or cariniform processes. Perennial; leaves usually palmately and pedately dissected. Russian name: moroznik.

Economic importance. These large-flowered plants bloom very early in spring, and deserve cultivation. Roots and rootstock contain the glucoside helleborin and should be investigated as a possible source of medicines. A decoction of *H. caucasicus* A. Br., including the roots, is used in Transcaucasia as a liniment for rheumatism (Rollov).

1. Follicles connate at base. Leaves pedately dissected into 5-7 lobes, which usually are rather deeply cleft into 2-3 secondary lobules, more or less pubescent beneath. Forests of the Ukraine 1. *H. purpurascens* Waldst. et Kit.
- + Follicles distinct at base. Leaves pedately dissected into 5-11 lance-ovate or elliptic entire lobes (1 or 2 lobes occasionally secondarily dissected). Forests of the Caucasus 2.
2. Sepals more or less intensely carmine-red 3. *H. abchasicus* A. Br.
- + Sepals white about the middle, with numerous small red spots, slightly purple at the margin and greenish inside the margin purple at the margin and greenish inside the margin. 4. *H. guttatus* A. Br. et Sauer.
- 58 ++ Sepals pale greenish-yellow-brown 2. *H. caucasicus* A. Br.

1. *H. purpurascens* Waldst. et Kit., Pl. rar. Hung. II (1805) 105; Ldb., Fl. Ross. I, 52; Schiffner, Monogr. Hellebor. in Nov. Act. Acad. Leopold. (1891) tab. LVI, CI, 122. - *H. niger* Ldb., Fl. Ross. I, 51. - Ic.: Waldst.

* From Helleboros, Greek name of an officinal plant, apparently *H. orientalis*.

** Treatment by Krashennikov.

et Kit., l. c., tab. 101; Schiffn., l. c., tab. VIII. — Exs.: Fl. Austro-Hung. exs. No. 2544. — Russian name: moroznik krasnovaty [reddish].

Perennial; radical leaves large, with long petioles, pedately dissected into 5–7 lobes, 10–15 cm long, each leaflet usually cleft to varying degrees into broad or narrow lanceolate lobules, smooth and lustrous above, pubescent beneath, mostly along the prominent veins (later glabrescent), margin biserrate; scapes not high, with 1–3 drooping flowers 3.5–5 cm in diameter; sepals rhombic-ovate, slightly arcuately recurved, outside a dingy violet-purple with dark veins, inside violet-purple and greenish, with rather strong reddish border; petal-nectaries yellow-green, rather intensely orange-yellow, near base closed by the involute upper lip; follicles connate at base, large, with very prominent veins, and sharp keel on the outside; style purple. February–April.

Broadleaf forests. — European part: U. Dnp. (W.), M. Dnp. (W. part of Podolia). **Gen. distr.:** Bal.-As. Min. (W.), Atl. Eur. (E.). Described from central Hungary. Type in Vienna.

2. *H. caucasicus* A. Br., in App. ad Ind. sem. Horti Berol. (1853) 14. — *H. ponticus* A. Br., l. c., 14. — *H. orientalis* Ldb., Fl. Ross. I, 52, non Lam. — *H. Kochii* Schiffn. in Engl. Bot. Jahrb. XI (1890) 109; Monogr. Helleb., l. c., 85; N. Busch in Fl. cauc. crit. III (1903) 22–23. — *H. casta diva* ssp. *Kochii* N. Busch., l. c., III (1903) 226. — Ic.: Schiffn., Monogr. Hell., l. c., tab. V (sub *H. Kochii* Schiffn.). — Exs.: Herb. Fl. Cauc. No. 6 (sub *H. casta diva* ssp. *Kochii* N. Busch).

Perennial; radical leaves 1 or 2, long-petioled, large, more or less coriaceous, pedately dissected into 5–11 lobes 8–15 cm long, lanceolate-elliptic or broadly elliptic, cuneate, margin biserrate; scapes of few bracts, their 1–3 flowers to 8 cm in diameter drooping at first; sepals spatulate, broad-ovate, slightly arcuately recurved at margin, pale greenish-yellow-brown; petal-nectaries slightly compressed, yellow-green, with inflexed margins; anthers elliptic, rounded at apex; follicles numerous, distinct at base, curved-ascending with straight style. Flowering in southern regions. Fl. December–March. (Plate VI, Figures 23 and 24).

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Broadleaf and coniferous forests. — Caucasus: Cisc., W. and E. Transc., Tal. **Gen. distr.:** Bal.-As. Min. (E.). Described from Transcaucasia. Type in Berlin.

3. *H. abchasicus* A. Br., in App. ad Ind. sem. Horti Berol. (1853) 14; Boiss., Fl. Or. I, 63 p.p.; Schiffn., Monogr. Hell., 94; Schiffn., Gatt. Helleb., l. c., 110; N. Busch in Fl. cauc. crit. III, 24. — *H. caucasicus* var. *abchasicus* Rgl., Gartfl. (1860) 93 et (1866) 33. — *H. colchicus* Rgl., in Bull. Acad. St. Petersb. (1856) 403 et Gartfl. (1856) 293; Boiss., Fl. Or. I, 62. — *H. casta diva* ssp. *abchasicus* N. Busch., l. c., (1903) 226. — Ic.: Koch, Allg. Gartztg. (1858) tab. 1; Rgl., Gartfl. (1860) tab. 293 (under the name of *H. abchasicus* A. Br., v. *colchicus* Rgl.). — Exs.: HFR No. 1703.

Perennial; radical leaves often 2–4, long-petioled, large, more or less coriaceous, glabrous, pedately dissected into 5–8 lance-ovate leaflets 12–14 cm long, occasionally violet, margin biserrate. Scapes few-leaved, sometimes reddish, with 2–4 flowers 4–8 cm in diameter, drooping at first;

sepals broad-ovate, slightly arcuately recurved, more or less strongly acuminate, margin slightly undulate, more or less intensely dark red, sometimes with even darker small spots; petal-nectaries slightly compressed, green, frequently with red stripes, with an involute lip; anthers emarginate, yellowish-white; follicles distinct, on very short stalks; style purple; seeds black, lustrous. Fl. January–February. (Plate VI, Figure 25).

Forests and forest margins. — Caucasus: W. Transc. Endemic. Described from Abkhazia. Type in Berlin.

Note. In areas of W. Transcaucasia, where *H. caucasicus* and *H. abchasicus* occupy a common habitat, plants have been found with unusually varied flower coloration. Side by side were encountered specimens with flowers colored dark purple, red, pale green, greenish white with a pink edge, white with a reddish tinge, etc. Most of these are probably of hybrid origin.

4. *H. guttatus* A. Br., et Sauer., in App. ad Ind. sem. Horti Berol. (1853) 13; Boiss., Fl. Or. I, 63; Schiffn. Gatt. Helleb. 111; Schiffn., Mon. Helleb., 98; N. Busch. in Fl. cauc. crit. III, 25. — *H. caucasicus* var. *guttatus* Rgl., Gartfl. (1860) 192. — Ic.: C. Koch, Allg. Garten-Zeit. (1858) tab. 2.

60 Perennial; radical leaves 2, long-petioled, pedately dissected with large ovate-lanceolate lobes. Scapes reddish-leprose below, few-leaved, with large drooping flowers; sepals broad-ovate or rhombic-ovate, acuminate or obtuse, slightly arcuately recurved, white above, sometimes greenish at base, slightly purple-red at margin, covered with numerous small reddish spots, rather intensely purple below but without spots; petal-nectaries closed, slightly compressed, yellowish-green; anthers oblong, obtuse or emarginate; follicles distinct, borne on very short stalks. March.

Forests. — Caucasus: E. Transc. Endemic. Described from the vicinity of Tbilisi. Type in Berlin.

Economic importance. Because of their beautiful flowers, many species of *Helleborus* were long ago cultivated as ornamental plants. Many garden hybrids are known, e.g., *H. guttatus* × *H. abchasicus* = *H. heyderi* Hort. bot. berol. [sic]; *H. abchasicus* × *H. purpurascens* = *H. lividescens* A. Br. et Sauer. *H. guttatus* is sometimes considered a wild hybrid of *H. caucasicus* × *H. abchasicus* (see, for example, N. Busch, l. c., 226).

Genus 513. **ERANTHIS*** SALISB.**

Salisb. in Transact. of Linn. Soc. VIII (1807) 303.

Flowers with 5–8 deciduous petaloid sepals; nectaries 5–8, broadened, emarginate or bilobate, sometimes bearing anthers or more or less tubular. Stamens of indefinite number. Fruitlets distinct, pedunculate. Ovaries many-ovuled. Perennial plants, wintering by means of tuberlike thickened subterranean stems. Aerial parts annual, herbaceous, with 1, 2, rarely more

* From the Greek *er*, a spring, and *anthos*, a flower.

** Treatment by Shipchinskii.

radical leaves from 1, rarely 2 floral axes, terminating in a sessile or pedicellate flower subtended by a leaf-shaped involucre.

1. Involucre of deeply dissected into numerous narrow linear lobes.
Fruitlets linear 1. *E. longistipitata* Rgl.
- + Involucre subentire or dissected into broader lobes. Fruitlets lanceolate 2.
2. Pedicels, peduncles, and fruitlets covered with delicate, white glandular hairs 3. *E. stellata* Maxim.
- + Pedicels, peduncles, and fruitlets glabrous, or else the peduncles, upper part of pedicels, and fruitlets densely covered along sutures with very short yellow glandular hairs 2. *E. sibirica* DC.

61 1. *E. longistipitata* Rgl., Bull. Soc. Nat. Mosc. XLIII (1870) 244; Huth in Engler's Bot. Jahrb. XVI (1893) 299. — Exs.: H.F. A. M., No. 126

Perennial; from a subglobose tuber arise 1 or 2 palmately 3–5-parted radical leaves and a leafless stem 3–25 cm long, bearing an involucre divided into linear segments, single flower short-pedicel at flowering; pedicel much elongated in fruit. Sepals 5–6, petaloid, yellow (pinkish when dry), elliptic; petal-nectaries tubular, subentire, one-third as long as the sepals; fruitlets borne on long declinate stalks, erect or declinate, linear with a longish straight or curved beak. May–June (?). (Plate VI, Figures 16 and 19).

Stony slopes and loose argillaceous soils, submontane belts, and mountains to the alpine zone. — Centr. Asia: Amu D., Syr. D., Pam.-Al., T. Sh.

Gen. distr.: Iran. (NE). Described from the Bugun mountains. Type in Leningrad.

2. *E. sibirica* DC., Syst. I (1818) 315; Prodr. I (1824) 46; Ldb., Fl. Ross. I, 52; Turcz., Fl. baic.-dahur. I, 65; Kryl., Fl. Zap. Sib. V, 1125. — *E. uncinata* Turcz., Cat. baic. (1838) No. 56; Ldb., Fl. Ross. I, 52; Huth in Engler's Bot. Jahrb. XVI (1893) 298. — *Helleborus sibiricus* Roem. et Schult., Syst. veget. II (1825) 658.

Perennial— with a subglobose tuber produces 1 palmately 3–5-parted radical leaf, with its lobes tripartite to the middle, and a leafless stem 5–28 cm long bearing an involucre divided into narrow entire or trifid leaf-like segments; pedicel of single flower short at first, later elongating, glabrous (var. *nuda* Schipcz.) or glandular-pubescent (var. *glandulosa* Schipcz.); sepals 5–6, petaloid elliptic or oval, yellow; petal-nectaries rather broad, bilobate at apex, one-fourth to one-third as long as the sepals; fruitlets on short stalks, obliquely declinate, narrowly lanceolate or oblong-elliptic with a shortish straight or more or less curved beak. May–June. (Plate VI, Figures 15 and 17).

Mossy localities both in submontane belts and in mountains. — W. Siberia: Alt.; E. Siberia: Ang.-Say. Endemic. Described from East Siberia (probably from Kultuk on Lake Baikal). Type in Geneva.

3. *E. stellata* Maxim., Primit. fl. Amur. (1859) 22; Huth in Engler's Bot. Jahrb. (1893) 299; Kom., Fl. Manchzh., II, 233. — *E. uncinata* var. *puberula* Rgl., Tent. Fl. Ussur. (1861) 8. — Ic.: Bull. Soc. Nat. Mosc. XXXIV, No. 3 (1861) tab. 1. — Exs.: HFR No. 1906.

62 Perennial; from a subglobose tuber arise 1, rarely 2-3 small, palmately parted radical leaves and a leafless stem 5-35 cm long terminating in an involucre divided into lance-linear incised segments; pedicel of single flower short at first, later elongating, pedicel covered with white glandular hairs. Sepals 5-8, petaloid, elliptic, mostly acuminate, yellow; petal-nectaries rather broad, bilobate at apex, one-fourth to one-third the length of the sepals; fruitlets on short stalks, stellately spreading at maturity; pedicel, stalks, and fruitlets covered with glandular hairs; fruitlets narrowly lanceolate or oblong-elliptic, with a shortish straight or more or less curved beak. April. (Plate VI, Figure 18).

Deep shade in mixed forests or forest margins, herb-covered localities, rich and moist soil. — Far East: Uss. Gen. distr.: Jap.-Ch. Described from the Amur River area. Type in Leningrad.

Genus 514. **NIGELLA*** L.**

L. Sp. pl. (1753) 534.

Sepals 5, deciduous, rarely persistent, petaloid, usually yellow, blue, or whitish, often with a claw. Petals 5-8, developed as nectaries, bilobate, the upper lip usually much shorter than the lower, shape frequently complex, with nectariferous pit. Stamens numerous, anthers obtuse or acuminate. Follicles more or less connate, inflated or flattened. Annual herbs; leaves pinnate or rarely entire or palmatisect. Russian name: chernushka.

1. Sepals 2-3, very small, half as long as petal-nectaries, with a very short beak 1. *N. garidella* Spenn.
- + Sepals more or less longer than petal-nectaries. Petals usually 5-10, rarely 3, with a longish beak 2.
2. Sepals yellow. Follicles flattened 3.
- + Sepals blue. Follicles inflated or slightly flattened 5.
3. Lower lip of petal-nectaries ovate-oblong, deeply emarginate, without long hispid lobes 2. *N. orientalis* L.
- + Lower lip of petal-nectaries produced into very long hispid lobes ... 4.
4. Hispid lobes of lower lip of nectaries as long as or slightly shorter than the anthers. Leaf lobes more or less broad, lance-linear, smooth 3. *N. oxypetala* Boiss.
- + Hispid lobes of lower lip of nectaries considerably longer than the anthers. Leaf lobes narrow-linear, with a more or less dense scabrous pubescence 3. *N. persica* Boiss.
- 63 5. Lower leaves entire, middle and upper leaves palmatipartite. Sepals directed upward, oblong, clawless, proximally, but slightly exceeding the flat, distally divided lower lip of nectaries. Follicles usually 3, rarely 5 6.
- + All leaves pinnate. At flowering sepals spreading or reflexed, usually with a basal claw (sepals narrowed). Follicles 5-10 7.

* The name of a plant in Matthaeus Sylvaticus; diminutive of the Latin niger, black.

** Treatment by Krashennnikov.

6. Sepals 12–14 mm long, to 8 mm broad; petal-nectaries to 9 mm long. Follicles including the beak to 2 mm long. . . 11. *N. Bucharica* N. Schipcz.
- + Sepals 5–8 mm long, 2–2.5 mm broad; petal-nectaries to 5 mm long. Follicles, including beak, to 10 mm long . . . 10. *N. integrifolia* Rgl.
7. Follicles connate to level of base of style . . . 8.
- + Follicles connate for one-half to two-thirds of their length . . . 10.
8. Glabrous plants; seeds more or less strongly rugose or rugose-tuberculate . . . 9.
- + Plants roughened below, glandular-pubescent from the middle; seeds almost smooth; but slightly tuberculate at high magnification . . . 9. *N. glandulifera* Freyn et Sint.
9. Follicles smooth, leaf lobes subulate; upper leaves enveloping the flower, forming a kind of spathe, larger than the flower . . . 8. *N. damascena* L.
- + Follicles granularly tuberculate, leaf lobes linear, upper leaves not forming a spathe longer than the flower . . . 7. *N. sativa* L.
10. Follicles connate to the middle, or rarely to two-thirds of their length, with 3 conspicuous veins from base to tip, slightly divergent distally. Sepals 15–20 mm long, short-acuminate. Anthers long-acuminate. Light green and glaucescent plants . . . 5. *N. arvensis* L.
- + Follicles connate to two-thirds at their length, with longitudinal veins prominent only distally at apex, sepals 10–12 mm long, obtuse; anthers with a short mucro or obtuse. Dark green plants. . . 6. *N. segetalis* M.B.

Section 1. **GARIDELLA** Prantl, in Engl. Bot. Jahrb. IX (1887) 244. — Sepals oblong, whitish-pink, shorter than nectaries. Follicles 3, small, with a short beak.

1. *N. garidella* Spenner, Monogr. Nigell. (1829) 11; Shmal'g., Fl. I, 25; N. Busch in Fl. cauc. crit. III, 26–27. — *Garidella nigellastrum* L. Sp. pl. (1753) 425; DC., Prodr. I, 48; Ldb., Fl. Ross. I, 54; Boiss., Fl. Or. I, 64. — Ic.: Bot. Mag. tab. 1286.

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Annual; glabrous; stem very prominently ribbed, erect from the middle or in upper part, more or less branched; leaves 2–3 cm long, bipinnately dissected into few linearly setose lobules. Sepals whitish-pink, oblong, 3–4 mm long, margin sometimes sparsely ciliate; petal-nectaries small, on a long stalk (with a claw), the upper lip very short, lanceolate, the lower lip several times as long, divided into 2 narrow lanceolate lobes; follicles 3, more or less intimately connate, 6–7 mm long, with a very short beak. Seeds ovate with reticulate sculpture. June. (Plate VI, Figures 8 and 9).

Neglected fields and stony steppe slopes. — European part: Crim.; Caucasus: Cisc., Dag., E. Transc.; Centr-Asia: Mtn. Turkm. (Karakala). **Gen. distr.:** Med., Iran. Described from southern France (Provence). Type in London.

Section 2. **NIGELLASTRUM** DC. Prodr. I (1824) 48. — Sepals with a basal claw, yellow, considerably longer than nectaries. Follicles 5–8, flattened, with long styles.



PLATE VI.

1 - *Nigella sativa* L., anthers of this species and flower of *N. integrifolia* Rgl.; 2 - *N. segetalis* M.B., follicle; 3 - *N. segetalis* M.B., nectary; 4 - *N. orientalis* L.; 5 - *N. sativa* L.; 6 - *N. arvensis* L.; 7 - *N. damascena* L.; 8 - *N. garidella* Spenn., follicle; 9 - *N. garidella* Spenn., nectary; 10 - *N. persica* Boiss.; 11 - *N. oxypetala* Boiss., nectary; 12 - *N. oxypetala* Boiss., fruit and cross section of a follicle; 13 - *N. bucharica* N. Schipcz., nectary; 14 - *N. integrifolia* Rgl.; 15 - *Eranthis sibirica* DC., nectary of Sayan plant; 16 - *E. longistipitata* Rgl.; 17 - *E. sibirica* DC., nectary; 18 - *E. stellata* Maxim.; 19 - *E. longistipitata* Rgl., habit, fruit; 20 - *Callianthemum sajanense* (Rgl.) Witasek; 21 - *C. isopyroides* (DC.) Witasek; 22 - *C. angustifolium* Witasek; 23, 24 - *Helleborus caucasicus* A. Br.; 25 - *H. abchasicus* A. Br., nectary.

Section 2. *NIGELLASTRUM* DC., Prodr. I (1824) 48. — Sepals with a basal claw, yellow, considerably longer than nectaries. Follicles 5–8, flattened, with long styles.

2. *N. orientalis* L., Sp. pl. (1753) 534; Boiss., Fl. Or. I, 69; N. Busch in Fl. cauc. crit. III, 23. — Ic.: Bot. Mag., tab. 1264; Gaertn., Fruct. et Sem. II, tab. 119.

67 Annual; stem glabrous, distinctly faceted; leaves bipinnatisect, with few narrow linear lobules, margins revolute and more or less densely covered with short bristles sometimes extending to the midrib. Sepals yellow, to 1.5 cm long, oblong, narrowed toward base into a short stalk, at apex passing into a short sometimes colored cusp, with short bristles along veins beneath, wilting at end of flowering; petal-nectaries half as long as the sepals, with a short broad stalk; upper lip very short, broad-ovate, triangularly acuminate, the lower lip twice as long, ovate-oblong in the middle, more or less deeply and narrowly incised from above with long white hairs; stamens short-acuminate; follicles 5–12, flattened, connate for almost half their length, strongly divergent above, greenish yellow, lustrous, 2–3 cm long, with 3 dorsal veins, passing into a straight beak as long as or somewhat shorter than the follicles. Seeds ovoid. May–June. (Plate VI, Figure 4).

Cultivated fields and steppe slopes. — Caucasus: E. Transc. **Gen. distr.:** Bal.-As. Min. (E.), Arm.-Kurd. Described from Asia Minor (vicinity of Aleppo) [sic]. Type in London.

3. *N. oxypetala* Boiss. in Ann. Sc. Nat. ser. II, XVI (1841) 357; Boiss., Fl. Or. I, 69; N. Busch in Fl. cauc. crit. III, 28.

Annual; glabrous; stem distinctly faceted, more or less branched; leaves pinnately dissected into few linear-lanceolate lobes, the terminal lobe frequently larger, with prominent veins beneath, petiole proximally white-scarious on both sides. Sepals 1–1.5 cm long, yellow, ovate-lanceolate, tapering to base, short-acuminate; petal-nectaries small, basally narrowed into a long stalk, the upper lip very short, rounded-ovate, the lower lip broadened in its lower part, with 2 short horizontal lateral, orbicular lobes, the lip proper produced into 2 long setiform lobes as long as the stamens, covered with isolated long hairs above; anthers short-acuminate; follicles flattened, connate to middle or almost to middle, diverging slightly at apex, 1–1.5 cm long, greenish yellow, lustrous, with 3 dorsal veins passing into lower part of almost straight 1-cm long beak; seeds compressed, with a border. May–June. (Plate VI, Figures 11 and 12).

Cultivated fields and steppe slopes. — Caucasus: S. Transc. (Erevan). **Gen. distr.:** Bal.-As. Min. (E.), Arm.-Kurd. Described from Asia Minor. Type in Geneva.

*4. *N. persica* Boiss. in Ann. Sc. Nat. ser. II, XVI (1841) 358. — *N. oxypetala* var. *tenuifolia* Boiss., Fl. Or. I (1867) 70.

Annual; stem simple or branched in upper part, distinctly faceted, the facets slightly scabrous; leaves bipinnately dissected into narrow-linear lobules, strongly scabrous owing to more or less dense short stiff hairs borne mainly along margins of lobules and on lower veins, petiole proximally broadly white-scarious on both sides. Sepals to 1.5 cm long, yellow,

68 lanceolate, tapering to base, short-acuminate, slightly scabrous beneath by short stiff hairs, horizontally spreading or recurved; petal-nectaries small with a long basal stalk, the upper lip short, rounded-lanceolate, the lower lip broad in its lower part, with 2 short horizontal orbicular lobes and 2 long setiform lobules above, considerably longer than the stamens and covered with long sparse hairs above; stamens short-acuminate; follicles 6, flat, connate to three-fourths of their length, slightly divergent above, to 2 cm long, greenish yellow; beak straight, to 1 cm long. June. (Plate VI, Figure 10).

Steppe slopes. — In regions of Turkey bordering on S. Transc. Gen. distr.: Bal.-As. Min. (E.), Arm.-Kurd., Iran. Described from Iran. Type in Geneva.

Section 3. *EUNIGELLA* Prantl in Engl. Bot. Jahrb. IX (1887) 244. — Sepals with a claw, azure, longer than nectaries. Follicles 5–10, inflated or slightly compressed, with a more or less long beak.

5. *N. arvensis* L., Sp. pl. ed. II (1762) 753; Ldb., Fl. Ross. I, 84; Boiss., Fl. Or. I, 65; Shmal'g., Fl. I, 25; N. Busch in Fl. cauc. crit. III, 29. — Ic.: Rchb., Ic. Fl. Germ. IV, tab. 120, f. 4735. — Exs.: HFR No. 303 (sub nom. *N. sativa* L.).

Annual; glaucous-green; stem ribbed, sometimes finely torulosely roughened along ribs, erect, more or less branched; leaves 2–4 cm long, pinnately dissected into few narrow-linear lobes, sometimes with reflexed, finely tuberculate rough margins. Sepals 1.5–2 cm long, rounded obovate, with sharply prominent veins, at upper margin slightly sinuate, very abruptly short-acuminate, in lower part abruptly narrowed into a claw; petal-nectaries small, on short stalks, the upper lip proximally rounded-broadened, abruptly elongating into a cusp, considerably shorter than the ovate, slightly pubescent lower lip, the latter often green with blue transverse stripes and dissected into 2 lobules, callously thickened above; anthers long-acuminate; follicles oblong, strongly roughened by small tubercles, connate for half their length, strongly ribbed dorsally, the ribs passing into a long tuberous longitudinally rounded beak about as long as the ovaries proper. May–August. (Plate VI, Figure 6).

Weed-infested places, cultivated fields, steppe slopes, and occasionally stony slopes. — European part: Lad.-Ilm., M. Dnp., U. Dnp., Bl., L. Don, Crim.; Caucasus: Cisc., Dag., E., W., and S. Transc., Tal.; Centr. Asia: Kyz. K. (W.). Gen. distr.: Centr. and Atl. Eur., Med. Described from S. Europe. Type in London.

Note. There is a more glaucous form with profusely branched stem, shorter thicker leaf lobules, and more torosely scabrous follicles (var. *divaricata* Boiss.).

69 6. *N. segetalis* M. B., Fl. taur.-cauc. II (1808) 16; Ldb., Fl. Ross. I, 55; Boiss., Fl. Or. I, 65; N. Busch in Fl. cauc. crit. III, 30. — *N. tuberculata* Griseb., Spic. Fl. Rum. I (1843) 318. — *N. foeniculacea* DC., Syst. I (1818) 328; Ldb., Fl. Ross. I, 58. — Ic.: M. B., Cent. pl. rar. ross. I, tab. 25. — Exs.: Dörfler, Herb. Norm. No. 4464; Calier, It. taur. 1900 No. 534 (sub *N. tuberculata* Griseb.).

Annual, green, glabrous; stem erect, sulcate, simple or more or less profusely branched almost from base; leaves bipinnately dissected into few linear or linear-setose lobules. Sepals 10–12 mm long, glabrous, obovate, obtuse, abruptly short-attenuate at base, becoming recurved before end of flowering; petal-nectaries on a stalk, sparsely hairy, the upper lip proximally broad, oblong-lanceolate, elongated above into a linear-subulate mucro shorter than the lower lip, deeply dissected at the middle into 2 lanceolate lobes tapering into callous thickenings; follicles connate for two-thirds of their length, slightly divergent above, more or less strongly granular-tuberculate (i. e., [not] glandular), narrowly terete, to 2 cm long, dorsally rounded at base, with 3 prominent veins above, these passing into a beak half as long as the ovary. June–July. (Plate VI, Figures 2 and 3).

Cultivated fields, weed-infested places, and steppe slopes. — European part: Bl., Crim.; Caucasus: E. and S. Transc. **Gen. distr.:** Bal.-As. Min., Arm.-Kurd., Iran. Described from the Crimea. Type in Leningrad.

Note. Apart from the typical form, there is another form distinguished by its simple or slightly branched stem, narrow leaf lobules, and large, to 1.5 cm long, sepals (var. *armena* (Stev.) Boiss.).

7. *N. sativa* L., Sp. pl. ed. II (1762) 753; Ldb., Fl. Ross. I, 55; Boiss., Fl. Or. I, 68; N. Busch in Fl. cauc. crit. III, 31. — Ic.: Sibth., Fl. Graec. tab. 511; Rchb., Ic. Fl. Germ. IV, f. 4736.

Annual; leaves 2–3 cm long, bi- or tripinnately dissected into short linear divergent lobules; sepals oblong, 1–1.5 cm long, obtuse, basally narrowing into a short stalk; petal-nectaries with a short stalk, slightly pubescent, the upper lip oblong, tapering upward into a linear cusp, slightly shorter than the lower lip, the latter parted to the middle, or deeper into 2 lobules broadened and with a tubercle in the middle and tapering toward base apically with callous thickenings at the apex. Anthers obtuse or slightly acuminate; follicles granular-torulose, inflated, connate almost to apex, to 1.5 cm long, dorsally rounded, with a ribbed longitudinally involute beak about as long as the ovary. Seeds triquetrous, rugose-tuberculate. May–August. (Plate VI, Figures 1 and 5).

Cultivated fields, gardens, and steppe slopes. — European part: U. Dnp., M. Dnp., Bl., Crim.; Caucasus: Cisc., E. Transc.; Centr. Asia: Balkh., T. Sh., Pam.-Al. **Gen. distr.:** Med., Bal.-As. Min., Arm.-Kurd., Iran., Dzu.-Kash. Described from the Mediterranean area (Egypt, Crete). Type in London.

70 **Economic importance.** The highly nectariferous seeds, called "black kummel," are used as a spice in the baking of bread, the pickling of cucumbers, the preparation of sauerkraut, etc. In many countries of Europe and Asia, the plant is cultivated for the fatty oil contained in the seeds.

8. *N. damascena* L., Sp. pl. (1753) 753; Ldb., Fl. Ross. I, 55; Boiss., Fl. Or. I, 68; Shmal'g., Fl. I, 26; N. Busch in Fl. cauc. crit. III, 32. — *N. taurica* Stev. in Bull. Soc. Nat. Mosc. XXX, 2 (1856) 283. — Ic.: Sibth., Fl. Graeca tab. 509; Rchb., Ic. Fl. Germ. IV, f. 4737. — Exs.: Fl. Hercegovinae No. 8.

Annual, glabrous; stem erect, faceted, sometimes slightly violet; leaves rigid, bi- or tripinnately dissected into narrow linear-setose lobules with

revolute margins, sometimes with short bristles, with a sharply prominent keel beneath; upper leaves close to flower, forming a spathe which overgrows the flower. Sepals blue, ovate-oblong, elongated into a more or less long cusp, abruptly tapering below into a short more or less broad stalk, several times as long as the petal-nectaries, the latter with upper lip obtuse-ovate, half as long as the lower lip, which is dissected to the middle into lanceolate lobes with a central tubercle covered with long hairs; stamens obtuse; follicles 5, inflated, 1–1.5 cm long, connate almost to apex, as long as or several times longer than the beak; seeds triquetrous, transverse-rugose. May–August. (Plate VI, Figure 7).

Steppe slopes, gardens, and weed-infested places. — European part: M. Dnp., Crim.; Caucasus: Cisc. (W.), E. Transc. Gen. distr.: Med., Bal.-As. Min. Described from S. France (Narbonne). Type in London.

Note. Nectariferous plants. The seeds, which are used medicinally, contain the alkaloid damascenine and also an essential oil.

9. *N. glandulifera* Freyn et Sint. in Bull. Herb. Boiss. Ser. II, No. 7 (1903) 559.

Annual, green, scabrous at base, densely glandular from the middle; stem 20–40 cm high, little branched, erect, ribbed; leaves pinnately dissected into lance-linear lobules. Sepals 8–9 mm long, pale blue, oblong-triangular or obovate-triangular, acuminate, tapering below into a short stalk; petal-nectaries very small, pubescent, the upper lip lanceolate and shorter than the lower lip, the latter parted into 2 small blue obovate lobules with terminal thickenings; anthers obtuse; follicles 5–9, inflated, dorsally rounded, slightly cariniform, connate almost to apex, with an almost flat or involute beak; seeds ovoid-triquetrous, appearing almost smooth, finely torulose when magnified. June.

71 Gardens. — Centr. Asia: Mtn. Turkm. Endemic. Described from Turkmenistan (Karakala). Type in Vienna.

Note. Described from cultivated specimens. The specific status of this form is doubtful.

Section 4. *KOMAROFFIA* (O. Ktze.) Brand in Helios (1895) 13 Jahrb., No. 1, 12. *Komaroffia* O. Ktze. in A.H.P. X (1887) 144, gen. — Sepals blue, very slightly longer than nectaries. Follicles 3–5, inflated, with a short beak.

10. *N. integrifolia* Rgl. in Bull. Soc. Nat. Mosc. XLIII (1870) 246. — *N. diversifolia* Franch., Miss. Capus. Plant. Turk. (1883) 9. — *Komaroffia diversifolia* O. Ktze. in A.H.P. X (1887) 144. — lc.: Franchet, l.c.

Annual, with a more or less strong, pubescence of short crisps hairs, everywhere except the caducous glabrate radical leaves; stem 5–25 cm high, erect, simple or sometimes more or less profusely branched from the base; lower leaves entire, linear-lanceolate or oblong-lanceolate, 2–3 cm long; cauline leaves sessile, palmately cleft into narrow-linear or linear lobules; uppermost leaves an involucre 1.5–2 times as long as the flower. Sepals 5, straight, erect, oblong or ovate-oblong, obtuse, blue, 5–8 mm long,

short-pubescent on the outside; petal-nectaries slightly shorter than sepals, the lower lip ligulate, flat, to 5 mm long, more or less strongly pubescent on the outside, bifid above into short, slightly divergent lobes; follicles 3, connate almost to apex, inflated, short-pubescent, 5–6 mm long, passing into a short conical apically hamate beak; seeds triangularly flattened, verruculose-rugulose, mature seeds black-brown. May. (Plate VI, Figure 14, and the flower in Figure 1).

(Wormwood) arid steppes and shrub thickets, slopes, often stony slopes, weed-infested places, and cultivated fields. — Centr. Asia: Balkh. (S.), T. Sh., Pam.-Al. (lower zone), Amu D., Syr D., Kara K., Mtn. Turkm. **Gen. distr.:** Iran. (E.). Described from Tadzhikistan (Mogol-tau). Type in Leningrad.

11. *N. bucharica* N. Schipcz. in Not. Syst. Herb. Horti Petrop. V, No. 10 (1924) 174.

Annual, more or less densely covered with short crisp hairs; stem simple or branched from the middle; lower cauline leaves entire, linear-lanceolate, more or less long-attenuate toward base, usually glabrate, 2.5–4 mm long; middle and upper cauline leaves palmately dissected into narrow-linear lobules, uppermost cauline leaves forming a kind of involucre slightly overtopping the flower. Sepals 5, pale lilac-azure, persistent, short-pubescent on the outside, oblong, erect, 12–14 mm long, to 8 mm broad; petal-nectaries shorter than sepals, the lower lip flat, ligulate, to 9 mm long, often apically cleft for one-third of its length into 2 lobes, with long spreading hairs on the outside and 2 longitudinal veins, colored blue above; stamens obtuse; follicles 3–5, inflated, 6–8 mm long, connate almost to apex, pubescent, prolonged into a narrowly conical apically hamate beak about as long as the follicle; seeds faceted, verrucose-rugose, whitish. May–June. (Plate VI, Figure 13).

Steppe slopes. — Centr. Asia: Pam.-Al. Endemic. Described from Tadzhikistan (Gissar). Type in Leningrad.

Genus 515. **LEPTOPYRUM*** RCHB.**

Rchb. Consp. (1828) 192.

Flowers small, sepals petaloid, usually 5; petal-nectaries proximally infundibular, one-fourth to one-third as long as sepals, bilabiate, the lower lip short, emarginate, the upper considerably longer, entire; stamens mostly 10; fruit of 10 or more (to 20) narrow-lanceolate follicles, tapering into an almost straight beak; fruitlets numerous; seeds small, densely covered with tubercles. Annuals (apparently not invariably); cauline leaves alternate, glabrous, ternately or pinnately parted.

1. *L. fumarioides* (L.) Rchb., Consp. (1828) 192; Kom., Fl. Manchzh. II, 234; Drum. et Hutch. in Bull. of Miscell. Information Kew (1920) 159; Kryl., Fl. Zap. Sib. V, 1125. — *Isopyrum fumarioides* L., Sp. pl.

* From the Greek *leptos*, slender, and *pyron*, a fruit-stone or fruit.

** Treatment by N.V. Shipchinskii.

(1753) 557; Ldb., Fl. Ross. I, 53; Turcz., Fl. baic.-dahur. I, 66; Maxim. Primit. Fl. Amur., 23.— Ic.: Pall., Fl. Ross. tab.101, f.1; Rchb., Fl. Germ. IV (1839) tab. CXIII; Drum. et Hutch., l.c., p.159, f.3; Kom. et Alis., Key pl. Far East. Reg. I, tab.160.— Exs.: HFR No.1204.

73 Annual, glabrous, glaucous-green, usually strongly fruticose from the roots; stems 4–30 cm high, erect or arcuately ascending, simple or little branched, usually with a basal rosette of long-petioled leaves; cauline leaves alternate or rarely subopposite, short-petioled, the petioles broadening at base into a membranous sheath, with 2 auricles above; upper cauline leaves often subopposite or in whorls; leaf blades biternate; primary lobes long-petioled, secondary short-petioled or sessile, oblong, entire or 2–3-fid, more rarely lobulate; 1-flowered pedicels borne in small groups on nodes. Flowers 1 cm in diameter, yellowish white; sepals ovate acute, pale yellow; petal-nectaries one-fourth to one-third as long as sepals, unguiculate, proximally infundibular, bilabiate, their laminae ovate, the lower lip short, emarginate; claw half as long as lamina; follicles 5–20, straight, linear-oblong or linear-lanceolate with a straight beak, slightly curved at base, and lignified at maturity; seeds grayish brown or olive-grayish brown, densely tuberculate, ovoid. May–July.

Open slopes, steppes, pastures, weed-infested places, dry meadows, truck gardens, plowed fields, wasteland, solonchets, streets and roads, but everywhere as a weed.— W. Siberia: Ob, U. Tob., Irt., Alt.; E. Siberia: Yenis., Lena-Kol., Ang.-Say., Dau.; Far East: Ze.-Bu. Gen. distr.: Dzu.-Kash. (N.), Mong., Jap.-Ch., Tib. Recently naturalized in W. Europe (France, Belgium) and, apparently, in N. America. Described from Siberia. Type in London.

Genus 516. **ENEMION*** RAFIN.**

Rafin. in Journ. Phys. XCI (1820) 70; Drum. et Hutch. in Bull. of Miscell. Information Kew (1920) 159.

Nectaries absent, perianth simple, petaloid; filaments dilated toward apex; fruit usually of more than 2 carpels; flowers solitary or disposed in an umbelliform inflorescence. Perennial herbaceous plants with alternate leaves.

Section 1. **UMBELLATA** Drum. et Hutch., l.c., (1920).— Inflorescence umbelliform.

1. **E. raddeanum** Rgl., in Bull. Soc. Nat. Mosc. XXXIV, II (1861) 61; Drum. et Hutch. in Bull. of Miscell. Information Kew (1920) 160.— *Isopyrum Raddeanum* Maxim. in Mel. Biol. XI (1883) 639; Kom., Fl. Manchzh. II, 235.— Ic.: Rgl., l.c., tab. GG; Drum. et Hutch., l.c., fig. 4. B.

Perennial; rootstock abbreviated, each year producing 1–3 herbaceous annual stems 20–50 cm high; radical leaves absent or else 1 or 2, shorter than the stem, long-petioled; leaf blades ternate or biternate; the primary

* Name given by Rafinesque-Schmaltz; meaning unclear.

** Treatment by N.V. Shipchinskii.

lobes long-petioled, the secondary sessile, incised; middle lobe rhombic, lateral lobes oblique; cauline leaf 1 or none, similar to radical leaves but with shorter petiole or sessile; remaining leaves terminal, opposite, sessile, with proximal auricles, blades similar to those of radical leaves; 1-flowered pedicels arising in groups of 1-8 from axils of upper leaves, equal or subequal, 1-3.5 cm, forming an umbelliform inflorescence. 74 Flowers not more than 1.5 cm in diameter; sepals usually 5, petaloid, oblong with prominent veins, white or whitish; petal-nectaries absent; stamens in indefinite number, filaments dilated toward apex; fruit of 2-5 slightly curved lanceolate follicles with a straight or slightly curved beak one-fifth to one-fourth as long as the ovary proper, usually 2-seeded; seeds oval, dark grayish-brown, densely transverse-rugose. April-May. (Plate V, Figure 1a).

Virgin or almost unspoiled coniferous and mixed forests and loose humous soil. — Far East: Ze.-Bu., Uss. **Gen. distr.:** Jap.-Ch. Described from the upper reaches of the Lifudzin River. Type in Leningrad.

Genus 517. **ISOPYRUM*** L.**

L., Sp. pl. (1753) 557; Gen. pl. ed. V (1754) 242.

Calyx of 5-6 deciduous white, [rarely reddish] petaloid sepals; petal-nectaries absent. Follicles 2-5; flowers solitary. Perennial herbaceous plants.

1. *I. thalictroides* L., Sp. pl. (1753) 557; Ldb., Fl. Ross. I, 53; Shmal'g., Fl. I, 26; Drum. et Hutch. in Bull. of Miscell. Information (1920) 161. — Ic.: Drum. et Hutch., f. 5 A. — Exs.: HFR No. 1301.

Perennial; rootstock horizontal or oblique or subvertical, ramified with numerous, slender cordlike roots, stems 1 or several from tips of rootstock branches, stems and whole of plant completely glabrous, erect, terminally branched, 20-30 cm high, rarely somewhat higher, with 1-3 broad, scarious obtuse sheaths at base; leaves with basal membranous stipules, lower leaves petiolate, biternate, upper cauline leaves sessile, ternate or tripartite; leaflets obovate, usually trilobate. Flowers borne singly on long straight pedicels arising at a right or obtuse angle from axils of upper leaves; sepals oval or ovate, obtuse, 8-12 mm long, white or rarely reddish, petaloid; petal-nectaries present; stamens numerous; fruit of 2 or 3 follicles, these secund-lanceolate, flat, terminating in a shortish slender slightly curved beak. April.

Shady forests and forest clearings. — European part: U. Dnp., M. Dnp., Bl. Ubiquitous along the western frontier of the USSR, not beyond the Dnieper. **Gen. distr.:** Centr. and Atl. Eur., Med., Bal.-As. Minor. Described from mountain forests of Italy. Type in London.

* From the Greek *isos*, equal, and *pyron*, a fruit-stone or fruit; name given by Pliny to one of the species of *Thalictrum*.

** Treatment by N.V. Shipchinskii.

75 Genus 518. **SEMAQUILEGIA** * MAKINO**

Makino in Jap. Bot. Mag. XVI (1902) 119.

Calyx of 5 deciduous white petaloid sepals; petal-nectaries 5-8, alternating with sepals, small, concave, usually with small saccate concavities, infundibular toward base, broadening toward apex. Follicles 2-5.

1. *S. manshurica* Kom. in Notulae Syst. ex Herb. Horti Bot. Petrop. VI No. 1 (1926) 5. — *Isopyrum manshuricum* Kom., I.c. — Ic.: l.c. 6. — II.

Perennial; rootstock oblique, short or long, slender, the numerous tubers elongated at both ends, but more so at the lower end, small, attenuate, black or black-brown, mostly verticillate; numerous roots also present; stem 6-25 cm high, glabrous, rarely slightly pubescent, with 3-5 membranous whitish obtuse scales at base; radical leaf 1, long-petioled, ternate, cauline leaves short-petioled or sessile, tri- or bisected, with 2 basal scarious white stipules; leaf lobes petiolate, flabellate, deeply cleft or dentate, glabrous or bearing (mainly beneath) scattered ciliate hairs; secondary lobes basally attenuate, tridentate at apex with teeth more or less rounded. Pedicels 2-3 cm long arising singly from axils of upper leaves bear 1 or 2, rarely more flowers. Sepals 5, white, obovate or elongate-obovate, 7-8 mm long and 3.5-4 mm broad; petal-nectaries to 8, one-third as long as sepals, broadly rounded, tapering to infundibular base; stamens numerous; fruit of 2 follicles recurved at a right angle to the pedicels, lanceolate, naked or sparingly ciliate at the valves; beak half as long as follicle, subulate, straight or incurved; seeds smooth, grayish brown. May, fruit ripens in June.

Broadleaf and mixed forests with abundant humus and loose soil. — Far East: Uss. Gen. distr.: Jap.-Ch. Described from the mountains east of Harbin in Manchuria. Type in Leningrad.

Genus 519. **PARAQUILEGIA** † DRUM. et HUTCH. ††

Drum. et Hutch. in Bull. of Miscell. Information Kew. (1920) 156.

76 Sepals 5, petaloid. Petal-nectaries sessile or subsessile, more or less orbicular or rounded-elongate or else tubular toward base, concave at base, often with an apical notch. Fruit of 3-7 erect or declinate follicles. Seeds carinate or narrow-winged, often with a pectinate margin, lustrous, glabrous or with a papilliform down. Perennial plants, more or less densely caespitose. Leaves alternate, 2 or 3 times tripartite, petiolate, glabrous or pubescent.

* From the Latin semi, half, and aquilegia, columbine.

** Treatment by N.V. Shipchinskii.

† From the Greek para, beside, and the Latin aquilegia, columbine.

†† Treatment by N.V. Shipchinskii.

1. Ripe follicles approximate, erect; stems abbreviated. More or less densely cespitose; nectaries concave, but not tubular toward base. . . . 2.
- + Ripe follicles recurved, sometimes almost horizontal; stems elongated. Loosely cespitose plants with elongated rootstocks; nectaries tubular at base 4. *P. anemonoides* (Kar. et Kir.) N. Schipcz.
2. Glabrous plants, or else with very sparse scarcely discernible soft hairs confined to petioles of leaflets 3.
- + Plants covered with a dense, very short down 3. *P. caespitosa* (Boiss. et Hoh.) Drum. et Hutch.
3. Seeds glabrous; leaf lobes deeply cleft into narrow lobules 2. *P. microphylla* (Royle) Drum. et Hutch.
- + Seeds downy; leaf lobes broad-lobuled 1. *P. grandiflora* (Fisch.) Drum. et Hutch.

Section 1. **CAESPITOSAE** N. Schipcz. — Stems abbreviated. Plants more or less densely cespitose; nectaries elongate-rounded, concave, not tubular at base.

1. *P. grandiflora* (Fisch.) Drum. et Hutch. in Bull. of Miscell. Information Kew. (1920) 156. — *Isopyrum grandiflorum* Fisch. ex DC., Prodr. I (1824) 48; Kryl., Fl. Zap. Sib. V, 1127. — *I. uniflorum* Aitch. et Hemsl. in Journ. Linn. Soc. XIX (1875) 149. — *Aquilegia anemonoides* Willd. in Mag. Ges. Naturf. V (1816) 401. — Ic.: Willd., l.c., tab. 9, f. 6.

Perennial; rootstock thick, multicapital; stems abbreviated, more or less densely cespitose; lower part of stem densely covered with remains of petioles; leaves petiolate, petioles broadened at base; leaf blades with 9 tripartite leaflets, borne on short or more or less long petioles; their lobes 3-lobuled, glabrous, green or slightly blue, thickish. Scapes as long as or longer than the leaves, 1-, rarely 2-flowered, with 2 opposite or slightly distant bracts narrowly lanceolate-subulate and at some distance from the flower; base of bracts very abruptly broadened into almost scarious axils; flowers large, to 3–4 cm in diameter, pale lilac or almost white; sepals usually 5, petaloid, broadly elliptic, 2.5–3.6 times as long as the petal-nectaries, the latter obovate, with an apical notch or almost bilobate, yellowish, attenuate and impressed toward base, forming a saccate concavity; stamens numerous, slightly longer than petals; carpels 3–7, styles straight, shorter than ovaries; fruit a lanceolate follicle, slightly membranous with prominent veins and a straight beak, one-third of its entire length; seeds oblong, olive-grayish brown, often marginate, with dense very short down. June.

Rock fissures, rocky scarps, stony slopes, and rock streams — all in the alpine zone. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb., Pam.-Al., T. Sh. **Gen. distr.:** Iran., Ind.-Him., Dzu.-Kash., Mong. (W.), Tib. Described from Altai. Type in Leningrad.

2. *P. microphylla* (Royle) Drum. et Hutch. in Bull. of Miscell. Information Kew (1920) 157. — *Isopyrum microphyllum* Royle, Illustr. bot. Himal. (1839) 54, tab. 1, f. 4; Kryl., Fl. Zap. Sib. V, 1128. —

I. grandiflorum var. *microphyllum* Finet et Gagnepain in Bull. Soc. Bot. de France IV (1904) 409. — Ic.: Royle, Illustr. Bot. Himal. (1839) tab. 1, f. 4; Drum. et Hutch. in Bull. Miscell. Information Kew (1920) 157.

Perennial; very similar to the preceding from which it is distinguished by usually long-petioled leaves, more deeply dissected blades, their lobes in turn deeply dissected into narrow lobules, glabrous, grayish brown, lustrous seeds with simple or pectinate margin on one side, often with a curled pectinate outgrowth at upper end. June.

Rocky places in the alpine and subalpine zones. — W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau. (Khamar-Daban); Centr. Asia: Dzu.-Tarb., Pam.-Al., T. Sh. **Gen. distr.:** Ind.-Him., Dzu.-Kash., Mong., Jap.-Ch. Described from the Himalayas. Type in London.

Note. In addition to the basic form with narrow leaf lobes, there is f. *latifolia* N. Schipcz. with very broad, almost semiorbicular lobes.

3. *P. caespitosa* (Boiss. et Hoh.) Drum. et Hutch. in Bull. of Miscell.

Information Kew (1920) 158. — *Isopyrum caespitosum* Boiss. et Hoh. in Boiss. Diagn. Ser. I, VIII (1849) 7; Fl. Or. I, 64.

Perennial; similar to the two preceding species, but plant and especially the leaves completely covered with a dense very short down clearly visible at 10 X magnification. June.

Habitat, the same as that of the two preceding species. — Centr. Asia: Pam.-Al., T. Sh. **Gen. distr.:** Iran., Ind.-Him. Described from Iran. Type in Geneva.

Section 2. ISOPYROIDES N. Schipcz. — Stems more or less elongated. Plants loosely caespitose with slender elongated rootstocks; nectaries almost tubular toward base.

78 4. *P. anemonoides* (Kar. et Kir.) N. Schipcz. in Notulae Syst. ex Herb. Horti Petrop. V, No. 4 (1924). — *Isopyrum anemonoides* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 135; Kryl., Fl. Zap. Sib. V, 1128. — *I. thalictroides* Hook., Fl. Brit. Ind. I, 23, non L. — *I. uniflorum* Aitch. et Hemsl. in Journ. Linn. Soc. XIX (1875) 149. — *Paraquilegia uniflora* Drum. et Hutch. in Bull. of Miscell. Information, Kew (1920) 158. — Ic.: Maxim., Fl. Tangut. (1889) tab. 8.

Perennial; loosely caespitose; rootstock slender, long, distal part covered with petioles of dead leaves; scapes herbaceous, annual, to 25 cm high; petioles of radical leaves to 15 cm high, blades ternate, basal lobes with long and secondary with short petioles, the terminal lobes sessile, deeply trifid, cuneate in outline; upper part of flowering stem usually bears 1 or 2, rarely 3 leaves similar to the radical leaves but short-petioled; 1-flowered pedicels, to 7 cm long, arising in axils of upper leaves, sometimes with 2 ovate bracts. Flowers not more than 18 mm in diameter, white or yellowish white; sepals mostly 5, petaloid, oval, with conspicuous veins; petal-nectaries as many as sepals; stamens numerous with rounded-elliptic anthers; carpels 2–5, erect, with short stigmas, follicles horizontally recurved at maturity, lanceolate, with conspicuous oblong anastomosing veins; seeds oblong, almost black, lustrous, smooth. June.

Rocks, rock fissures, and rock streams in the subalpine and alpine forest zones, sometimes also gravelly soil of forests. — Centr. Asia: Dzu.-Tarb., Pam.-Al., T. Sh. **Gen. distr.:** Iran., Ind.-Him., Dzu.-Kash., Tib. Described from Semireche [Dzhety-Su] (Lepsa and Sarkan) and the Ala Tau Mountains. Type in Leningrad.

Note. Two forms occur: (*f. nuda* N. Schipcz.) with stems and pedicels quite glabrous or with very sparse, delicate short white hairs and (*f. puberula* N. Schipcz.) with stems, petioles, and especially pedicels covered with a conspicuous rather dense and very delicate white down.

Genus 520. **COPTIS** SALISB.*

Salis. in Trans. Linn. Soc. VIII (1807) 305.

Sepals 5 or 6, whitish, deciduous. Petal-nectaries shorter than sepals, cuculliform or flat. Fruit apocarpous. Perennial herbs with alternate or radical leaves; flowers solitary or in a racemose inflorescence.

1. *C. trifolia* (L.), Salisb. in Trans. Linn. Soc. VIII (1807) 305; Maxim. Prim. Fl. Amur. (1859) 23; Huth in Engl. Bot. Jahrb. XVI (1893) 302; Kom. Fl. Manchzh. II, 235. — *Helleborus trifolius* L., Sp. pl. (1753) 784. — Ic.: Samoku Dzusetsu ed. 2, X (1874) tab. 38.

Perennial; rootstock slender, creeping, distally covered with remains of dead leaves; all leaves radical, long-petioled, ternate, petioles glabrous with short pubescence confined to the insertion point of the leaflets, the latter broad, obovate, cuneate, coriaceous with very prominent veins, margin unequally serrate-dentate; on lower surface of leaf covered with short setose hairs; scapes solitary, to 15 cm long, slightly elongating in fruit, proximally glabrous, pubescent below flower, frequently with a small, oblong entire bract in upper part of scape; flowers 1, rarely 2, 1–1.5 cm in diameter; sepals 5, ovate, acuminate, declinate, pale yellow, lilac on the outside toward base; petal-nectaries 5, rarely more, with narrow base broadening toward apex, yellow; stamens numerous; carpels usually 5, with short stalks which greatly elongate in fruit to form an umbellike structure; stalks covered with a delicate, short white down; fruitlets membranous, sublanceolate, gradually passing into a beak; seeds oblong, grayish-brown, lustrous, with an indistinct longitudinal furrow.

Coniferous mossy forests, and in the north, moss bogs. — E. Siberia: Lena-Kol.; Far East: Kamch., Okh., Uda, Uss. **Gen. distr.:** Arc. (Arctic America), Jap.-Ch., Ber., North America. Described from Canada. Type in London.

* Treatment by N.V. Shipchinskii.

Genus 521. **ACTAEA*** L.**

L. Sp. pl. I (1753) 504; Gen. pl. ed. 5 (1754) 283.—Christophoriana Moench, Meth. (1794) 276.

Flowers regular, in a simple or branched raceme. Calyx mostly with 4 petaloid caducous sepals. Petal-nectaries mostly 1–6 or absent, flat or slightly concave, spatulately broadened toward apex, without nectar pit. Stamens numerous, filaments often broadened distally. Carpel 1, ovary ovate or oval, 1-seeded, stigma broad, sessile. Fruit succulent, bacciform, many-seeded. Perennial herbaceous plants; leaves alternate, bi- or tritermately pinnate.

1. Fruits black 2.
 + Fruits red, rarely white 3. *A. erythrocarpa* Fisch.
 80 2. Peduncles slightly thickened, mostly red. Petal-nectaries rounded at apex, of even thickness, not erose; leaflets tapering into a cusp 1. *A. acuminata* Wallich.
 + Peduncles slender, mostly green. Petal-nectaries retuse, erose, at apex very thin and almost pellucid; leaflets abruptly tapering at apex 2. *A. spicata* L.

Note. Many authors have erroneously reported *A. rubra* Big. instead of *A. erythrocarpa* Fisch. from the USSR. *A. rubra* Big. is confined to North America and is distinguished by much-thickened peduncles and mostly emarginate, quasi-bilobate petal-nectaries.

1. *A. acuminata* Wallich, Catal. 4726 (1824); Royle Ill., Bot. Himal. Mount. I (1839) 57; Kom., Fl. Manchzh. II (1903) 236.—*A. spicata* var. *nigra* f. *acuminata* Huth in Engler's Bot. Jahrb. XVI (1893) 308.—*A. spicata* var. *melanocarpa* Rgl., Tent. Fl. Ussur. (1861) 12, non Ldb.

Perennial; rootstock thick, multicapital; stems herbaceous, annual, to 75 cm high, arising singly or several together from the rootstock, smooth, with grayish brown scales at base; leaves bi- or tritermately pinnate, leaflets broad-oval to subrhombic, incised, serrate-dentate, tapering into a rather long cusp; scattered ciliate hairs mainly confined to the veins. Flowers small, white, in oval racemes expanding to cylindric in fruit; pedicels thickish, mostly red in fruit; petal-nectaries shorter than ovary, subspatulate, thickish, rounded at apex; fruits black. Fl. May, fr. August.

Coniferous, mixed, and oak forests, and in shaded areas on stony humous soils.—Far East: Uss. Gen. distr.: Bal.-As. Min., Ind.-Him., Jap.-Ch., Tib. Described from India. Type in London.

Economic importance. All parts of the plant are poisonous.

2. *A. spicata* L., Sp. pl. (1753) 504, excl. var. β .—*A. spicata* L., Fl. Suec. ed. 2 (1755) 181; Shmal'g., Fl. I, 127; Kryl., Fl. Zap. Sib., 1129.—*A. spicata* var. *melanocarpa* Ldb., Fl. Ross. I (1842) 71; Korzh., Fl. Vost. Evrop. Ross. (1892) 122.—*A. nigra* Willd., Sp. pl. II, 2 (1799) 1139.—*A. Christophoriana* Gouan, Fl. Monsp. (1763) 152.—*A. spicata* var. *nigra* Willd., Sp. pl. II, 2 (1799) 1139; Huth in Engler's Bot. Jahrb. XVI, 308.—Ic.: Engl., Jahrb. XVI (1893) tab. 4.

* One of the Greek names for the elder.

** Treatment by N.V. Shipchinskii.

81 Perennial; rootstock thick, multicipital; stems herbaceous, annual, to 70 cm high, arising singly or several together from the rootstock, smooth or slightly pubescent distally, with grayish brown scales at base; leaves biternate; leaflets broad-oval, obtuse or short-acuminate, abruptly narrowed into petiole or even subcordate, margin incised and serrate-dentate with scattered ciliate hairs mainly confined to the veins, or else leaflets quite glabrous. Flowers small, white or whitish, in a short oval raceme expanding to cylindric in fruit; pedicels slender, remaining green or becoming dark grayish brown in fruit; petal-nectaries slightly elongated, usually as long as or very slightly longer than ovary, ovate or elliptic, tapering to a long claw, not thick, terminating in an unequal almost scarious almost erose margin; fruits black. May-June.

Shady forests. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U.V., V.-Kama, U. Dnp., M. Dnp., V.-Don, Transv., Bl., L. Don, L.V.; Caucasus: Cisc., Dag., W., E., and S. Transc., Tal.; W. Siberia: Ob (near Tobol'sk and Tyumen), Irt. (E.), Alt. Described from Europe. Type in London.

Note. In Siberia this species appears to be a relic of Pliocene broad-leaf forests, as indicated by an insular range in Altai considerably separated from the main range of its distribution (see Krylov, Fl. Zap. Sib., 1129-1130).

Economic importance. All parts of this plant are poisonous. The root acts as an emetic and laxative. Boiled with alum, the berries provide a black dye.

3. *A. erythrocarpa* Fisch. in Index Seminum Horti Bot. Petropol. I (1835) 20; Kom. Fl. Manchzh. II, 237. — *A. spicata* β . Turcz. Fl. baic.-dahur. I (1842) 84. — *A. spicata* var. *erythrocarpa* Ldb., Fl. Ross. I (1842) 71; Maxim. Prim. Fl. Amur. (1869) tab.4.

Perennial; rootstock thick, multicipital, stems herbaceous, annual, to 70 cm high, arising singly or several together from the rootstock, smooth or distally slightly pubescent, with grayish brown scales at base; leaves mostly triternate; leaflets oval or broad-lanceolate, short-acuminate, more or less attenuate at base (terminal leaflet usually cuneate), margins incised and serrate-dentate, with scattered ciliate hairs mainly confined to the veins, or else leaflets quite glabrous. Flowers small, white or whitish, in a short oval raceme expanding to cylindric in fruit; pedicels slender, remaining green or turning very slightly reddish in fruit; petal-nectaries slightly elongated, usually about as long as ovary, ovate or elliptic, rounded at apex, tapering into a basal claw; fruits red, rarely white (var. *leuco-carpa* (Ldb.) Gurcke). May-June.

82 Coniferous and mixed forests, often in the margins. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., V.-Kama, Transv.; W. Siberia: Ob, U. Tob. (N.), Irt. (E.), Alt.; E. Siberia: Yenis., Lena-Kol., Ang.-Say., Dau.; Far East: Kamch., Okh., Ze.-Bu., Uda, Uss., Sakh. Gen. distr.: Scand., Mong., Jap.-Ch. Described from Siberia. Type in Leningrad.

Note. Kamchatkan specimens are separated as a distinct variety by glabrous leaves, except for the veins which bear appressed hairs above, and by appressed ciliate hairs beneath (var. *kamczatica* Kom.). *A. erythrocarpa* penetrates far to the north, reaching the 65th parallel on the Ob River, as well as the lower reaches of the Lena River.

Economic importance. All parts of this plant are poisonous.

Genus 522. **CIMICIFUGA*** L.**

L. Amoen. acad. VIII (1785) 7; Huth in Engler's Bot. Jahrb. XVI (1893) 310.

Calyx petaloid, soon deciduous, 4 or 5-sepaled; petal-nectaries usually 4-5, rarely less, or even none, with a basal nectar pit. Stamens numerous, filaments longer than other flower parts; outer stamens sometimes strongly modified; with broadened filaments terminating in 2 apical lobes bearing hollow anther lobes, or else filament broadened and terminating in an almost scarious emarginate border. Carpels 1-8, 1-seeded. Fruit dry, follicles borne on more or less long stalks. Seeds bear long scarious scales of unequal length. Perennial herbaceous plants; the alternate leaves ternately pinnate or ternate or biternate. Flowers in a simple or compound bracteate raceme; racemes terminal or additional racemes arising from axils of upper leaves.

Economic importance. All species of the genus *Cimicifuga* are poisonous.

- | | | |
|------|--|---------------------------------------|
| | 1. Petal-nectaries bifurcate, bearing hollow anthers at the apexes; flowers unisexual | 2. <i>C. dahurica</i> (Turcz.) Maxim. |
| + | Petal-nectaries entire or with 2 apical scarious-tipped lobes; flowers perfect | 2. |
| | 2. Ovaries quite glabrous | 1. <i>C. heracleifolia</i> Kom. |
| + | Ovaries pubescent | 3. |
| | 3. Entire stem (except inflorescence) and main leaf petioles glabrous | 3. <i>C. simplex</i> Wormsk. |
| 83 + | Entire stem pubescent from base, with minute glandular hairs or else glabrous with the main leaf petioles covered with scattered squarrose hairs | 4. |
| | 4. Entire stem quite glabrous from base to inflorescence; leaf petioles and veins covered with scattered squarrose hairs | 5. <i>C. europaea</i> N. Schipcz. |
| + | Entire stem and all leaf petioles densely covered with minute glandular hairs | 4. <i>C. foetida</i> L. |

1. *C. heracleifolia* Kom. in A. H. P. XVIII (1901) 438; Kom., Fl. Manchzh. Manchzh. II (1903) 243.

Perennial; rootstock thick, multicapital; stems herbaceous, annual, to 1 m high or more, arising singly or several together from the rootstock, simple, sulcate in lower part, glabrous from base to inflorescence; lower cauline leaves with long, basally broadened petioles, biternate, with long-petioled lobes; leaf lobes broad-ovate acuminate, coriaceous, light green beneath, margins with large acuminate teeth, upper cauline leaves 1-3, smaller, ternately parted, glabrous. Inflorescence racemose, simple, but mostly with 2-8 short ramifications, these and pedicels covered with short gray hairs; bracts linear acuminate; flowers perfect, sepals 4-5, petaloid, caducous; petal-nectaries white, entire, spatulate above, terminating in an almost scarious entire or bilobate appendage; stamens numerous; carpels several, glabrous, stalked. August.

Dry argillaceous, argillaceous-stony slopes, completely open places, or among sparse thickets of *Corylus* and *Lespedeza*. — Far East: Uss.

* From the Latin *cimex*, a bug, and *fuga*, escape.

** Treatment by N. V. Shipchinskii.

(along the Suifun River). **Gen. distr.:** Jap.-Ch. Described from Korea (Kapsan). Type in Leningrad.

2. *C. dahurica* (Turcz.) Maxim., Prim. Fl. Amur. (1859) 28; Huth in Engler Bot. Jahrb. XVI (1893) 316. — *Actinospora dahurica* Turcz., Index seminum Horti Bot. Petrop. I (1835) 21; Fl. baic.-dahur. I (1842) 85. — *Actaea dahurica* Turcz., pl. exs. (1831). — *Actaea pterosperma* Turcz., pl. exsicc. — Ic.: Kom. and Alis., Oprod. rast. Dal'nevost. I (1931) 531, figs. 2 and 4.

84 Perennial; rootstock thick, multicipital; stems herbaceous, annual, to 1 m or more high, arising singly or several together from the rootstock, simple, round, slightly sulcate, glabrous from base to inflorescence; lower cauline leaves borne on long, basally broadened petioles, bi- or triternate, lobes petiolate or sessile; leaf lobes ovate acuminate, pinnatifid, or in the lower part even pinnatipartite, deeply serrate-margined; upper cauline leaves smaller and borne on shorter petioles; inflorescence a simple or compound raceme; axis of inflorescence, its ramifications, and pedicels covered with short gray hairs and a dense short glandular down; bracts linear acuminate; flowers unisexual; sepals petaloid, soon deciduous; petal-nectaries bifurcate, bearing hollow anthers at the apexes; stamens numerous, carpels several, with a gray pubescence, sessile or borne on short stalks. July–August.

Forest margins, shrub thickets, forests, and very dry places in valley meadows. — E. Siberia: Dau.; Far East: Ze.-Bu., Uss. **Gen. distr.:** Mong., Jap.-Ch. Described from Dauria, Type in Leningrad.

3. *C. simplex* Wormsk. in DC., Prodr. I (1824) 64; Turcz., Fl. baic.-dahur. I, 84; Maxim., Prim. Fl. Amur., 29; Kom., Fl. Manchzh. II, 241. — *C. foetida* var. *simplex* Huth in Engler Bot. Jahrb. XVI (1893) 325. — *Actaea macropoda* Turcz., pl. exsicc. 1831. — *A. podocarpa* Schlecht. in Linn. VI (1831) 583. — *C. ussuriensis* Oettingen in Acta H. B. Jurievensis, VI (1905) 138. — Ic.: Oettingen, l.c., tab. 1.

Perennial; rootstock thick, multicipital; stems herbaceous, annual, to 1 m high or somewhat higher, arising singly or several together from the rootstock, simple, round, slightly sulcate at base, glabrous from base to inflorescence; lower cauline leaves with long basally broadened petioles, biternate, lobes petiolate or subsessile ovate acuminate, pinnatifid or in lower part pinnatipartite, margins deeply serrate-dentate; upper cauline leaves few, smaller than the lower, mostly sessile. Inflorescence mostly a simple long terminal raceme, rarely ramified, axis and pedicels densely covered with short gray simple or glandular hairs; bracts broad, cuneate obovate, acuminate or rounded at apex; flowers perfect, sepals petaloid, soon deciduous; petal-nectaries oval, almost scarious at apex, entire or slightly emarginate; stamens numerous, carpels several, with gray pubescence, on short stalks, considerably elongated in fruit and abruptly curved at their base. July–September.

Damp shrub thickets, valleys and valley meadows, mounds in grassy bogs, forest margins, forest bogs, and grass plots. — E. Siberia: Dau.; Far East: Kamch., Okh., Ze.-Bu., Uda, Uss., Sakh. **Gen. distr.:** Mong., Jap.-Ch. Described from Kamchatka. Type lost.

4. *C. foetida* L., Syst. Nat. ed. XII (1767) 659 (non auct. fl. Europeae); Turcz., Fl. baic.-dahur. I (1842) 86; Kryl., Fl. Zap. Sib. V, 1131.

85 Perennial; rootstock thick, multicipital; stems herbaceous, annual, to 1 m, sometimes to 2 m high, arising singly or several together from the rootstock, simple or branched in upper part, round or angularly sulcate from base, densely covered with minute glandular hairs as are the petioles; lower cauline leaves with long basally broadened petioles, biternate, lobes long, imparipinnate, sessile; ovate acuminate, pinnatifid in their lower part mostly pinnatipartite, deeply serrate-margined; upper cauline leaves with shorter petioles or sessile. Inflorescence a simple, more often a branched raceme; all stems, branches, and pedicels covered with both minute glandular hairs and simple gray hairs, the latter most dense on pedicels; bracts subulate, as long as flowers; flowers perfect, sepals petaloid, soon deciduous; petal-nectaries entire, almost scarious at apex; stamens numerous, carpels 1-5, pubescent, sessile or on short stalks. July-August.

Forests, forest clearings and margins, meadows, and slopes. — W. Siberia: Ob (east of Omsk), Irt. (E.), Alt.; E. Siberia: Yenisei, Lena-Kol. (to Yakutsk), Ang.-Say., Dau. Gen. distr.: Mong. Described from Siberia. Type in London.

5. *C. europaea* N. Schipcz., sp. nova in Addenda VI, p. 720. — *C. foetida* L., ex parte et auct. fl. Europae et fl. Rossicae europaeae. — Exs.: HFR No. 1552 (sub *C. foetida* L.).

Perennial; rootstock thick, multicipital; stems herbaceous, annual, to 1 m or somewhat higher, rarely to 2 m high, arising singly or several together from the rootstock, simple or branched in upper part, round, slightly sulcate, glabrous from very base to inflorescence; lower cauline leaves with long basally broadened petioles, biternate with imparipinnate, sessile or short-petioled, ovate acuminate lobes, pinnatifid or in their lower part pinnatipartite, deeply serrate-margined; upper cauline leaves with very short petioles or subsessile; petioles and veins of leaves covered with scattered erect hairs beneath, glandular pubescence confined to inflorescence; inflorescence a simple, more often a branched raceme; all branches and pedicels covered with short gray hairs; bracts lanceolate-cuneate acute, shorter than the pedicels; flowers perfect, sepals petaloid, soon deciduous; petal-nectaries entire, more or less scarious at apex; stamens numerous; carpels up to 5, pubescent, sessile or on short stalks. July-September.

Broadleaf forest margins and surrounding meadows. — European part: M. Dnp., Bl. (NW). East of the Dnieper reported only for Poltava. Gen. distr.: Centr. Eur., Bal.-As. Min. (N.). Described from the vicinity of Boyarka station near Kiev. Type in Leningrad.

86 Note. Until now, the last two species, *C. foetida* and *C. europaea*, have not been separated although they are clearly differentiated morphologically and even more so geographically. There is no doubt that the European and Siberian races were only separated with the onset of glaciation. Thus, *C. foetida*, in its former definition, is absent from the entire area between the Dnieper and the Ob. Such a wide discontinuity in this particular area can be explained only by the action of the glaciers which destroyed all forest vegetation and associated life over a long period.

Genus 523. **AQUILEGIA*** L.**

L., Gen. pl. ed. 5 (1754) 237.

Calyx 5-sepaled, colored, often greenish-tipped; corolla 5-petaled; petals obliquely infundibular, produced into hollow, recurved or straight spurs directed downward between the sepals; stamens numerous, the innermost without anthers, with scarious, plicate-margined filaments; carpels 3-15, with long styles persistent in fruit; follicles many-seeded with oblique, transverse striation. Perennials with biternate or ternate leaves, mostly with short rootstocks and more or less stout roots.

1. Spurs short, saccate; sepals 2 or more times as long as spurs . . . 2.
- + Spurs longer 3.
2. Spurs straight or declinate. Flowers to 3 cm in diameter 1. *A. parviflora* Ldb.
- + Spurs hamately recurved distally. Flowers 6-10.5 cm in diameter. 10. *A. glandulosa* Fisch.
3. Spurs long, slender, ca. 2 mm in diameter 4.
- + Spurs of medium length, thick, more or less hamately recurved distally 8.
4. Carpels or stamens considerably exerted 5.
- + Carpels or stamens not exerted or slightly exerted 7.
5. Spurs straight, twice or almost twice as long as sepals. Central and eastern Asia 6.
- + Spurs hamate-tipped or almost spirally involute. Glandular-glutinous, densely pubescent plants (Caucasus) 14. *A. colchica* Kem.-Natadze.
6. Flowers greenish yellow or dingy blue or brownish red; styles mostly strongly exerted; limb of petals broader than sepals 4. *A. viridiflora* Pall.
- + Flowers milk white or lilac, rarely pink, limb of petal white or yellow; stamens exerted; limbs of petals narrower than or as broad as sepals (Central Asia) 5. *A. lactiflora* Kar. et Kir.
- 87 7. Spurs straight or arcuately declinate; pistils slightly exerted; limb whitish or bluish with yellow margin; pedicels glabrous, rarely sparsely hairy (Dauria) 2. *A. leptoceras* Fisch. et Mey.
- + Spurs obliquely curved distally; carpels and stamens not exerted; limb whitish; pedicels pubescent (Altai, Sayans) 3. *A. borodinii* Schischk.
8. More or less pubescent plants; pedicels glandular. Carpels 5-8 9.
- + Glabrous plants or with sparse, scattered hairs (in *A. amurensis* the leaflets more or less pilose beneath). Carpels generally 5; flowers lilac-blue, rarely white 12.
9. Width of flower subequal to its length 10.
- + Width of flower greater than its length; flowers dark red or violet. Carpels 5 (Central Asia) 7. *A. karelini* (Baker) O. et B. Fedtsch.
10. Flowers ca. 4.5 cm in diameter 11.
- + Flowers 5-8(10) in diameter, blue with white limb. Carpels 5-8 (Caucasus) 8. *A. olympica* Boiss.

* The Russian name "vodosbor" is an exact translation of the Latin *aqua*, water, and *lego*, I collect.

** Treatment by A.A. Bulavkina.

11. Sepals oval; spurs, measured from point of attachment, slightly shorter than sepals. Flowers blue, violet, pink, red, or white (European part) 9. *A. vulgaris* L.
- + Sepals broad-lanceolate, acute; spurs, measured from point of attachment, about as long as sepals. Flowers wine red or violet or rarely white, limb yellowish (Far East) 6. *A. oxysepala* Fisch. et Mey.
12. Glabrous plants. Flowers 5–6 cm in diameter; spurs as long as the limb, mostly slightly recurved distally, rarely annularly volutes 11. *A. sibirica* Lam.
- + Plants mostly with sparse hairs on pedicels, rarely also on leaves; spurs strongly recurved 13.
13. Flowers 2.5–5.5 cm in diameter, mostly with subacute sepals; spurs slightly shorter than sepals; leaves thin, small, pilose beneath, rarely glabrous. Follicles mostly small, without style 1.5–3 cm long 12. *A. amurensis* Kom.
- + Flowers 4.5–5.5 in diameter with obtuse sepals; leaves flabellate, firm, intensely blue, most often glabrous. Follicles 3.5–4.5 cm long (Sakhalin) 13. *A. flabellata* Sieb. et Zuc.

Note. Numbers in the text refer to flowers separated into their component parts.

Series 1. *Parviflorae* Bul. — Flowers 2–3 cm in diameter (very exceptionally 4–4.3 cm). Sepals prostrate. Spurs thick, straight or slightly declinate, about as long as the oval mitriform subacute limb of petal.

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Stamens and pistils considerably exserted. Carpels 5.

1. *A. parviflora* Ldb. in Mém. Acad. Sc. Petersb. V (1815) 544; Ldb., Fl. Ross. I, 57; Turcz., Fl. baic.-dah. I, 71. — *A. thalictroides* Schlecht. in Linnaea VI (1831) 581. — Ic.: Ldb., Ic. Pl. Fl. Ross. tab. 107.

Perennial; stem 10–45 cm high, with glabrous or rarely pubescent pedicels, leafless or with 1–3 small ternate leaves, the latter with linear-lanceolate or linear lobes; radical leaves numerous, biternate, as long as or slightly longer than half the height of stem, coriaceous with recurved margins, very exceptionally thin, lustrous above, glaucescent beneath, glabrous with sparse hairs or white-tomentose; middle leaflet petiolate, oval-cuneate, 1.5–3 cm long, 1–3.5 cm broad, lateral leaflets sessile. Flowers up to 16 or more, lateral or strongly declinate; sepals blue or violet, rarely white, ca. 1.7(2.0) cm long and 1.2(1.5) cm broad; petals ca. 0.7(1.2) cm long, half as long as sepals; limb of petal white, spur blue (or white), ca. 0.2 cm long; young carpels glandular-pubescent; ripe follicles strongly diverging at apex, with sparse glands or strongly glandular-pubescent, ovary 1.3–2 cm long; styles 0.5 cm long. (May) June (July). (Plate VII, Figure 2).

Open slopes, oak forests, and forest margins; singly or in groups. — E. Siberia: Lena-Kol., Ang.-Say. (E.), Dau.; Far East: Okh. (S.), Ze.-Bu., Uda, Uss., Sakh. Gen. distr.: Manchuria, N. Mong. Described from the Lena River. Type in Leningrad.



PLATE VII. 1 - *Aquilegia oxysepala* Fisch. et Mey.; 2 - *A. parviflora* Ldb.; 3 - *A. sibirica* Lam.; 4 - *A. flabellata* S. et Z.; 5 - *A. glandulosa* Fisch.; 6 - *A. lactiflora* Kar. et Kir.; 7 - *A. olumpica* Boiss.; 8 - *A. viridiflora* Pall.; 9 - *A. leptoceras* Fisch. et Mey.; 10 - *A. vulgaris* L.; 11 - *A. Karelinae* (Baker) O. et B. Fedtsch.; 12 - *A. Borodini* Schischk.; 13 - *A. amurensis* Kom.

Series 2. *Leptoceras* Bul. — Low-growing glabrous or glabrate plants with slender straight or arcuately declinate spurs. Flowers ca. 5 cm in diameter. Spurs 1.5–2 times as long as truncate limb of petal. Styles slightly exserted. Carpels 5.

2. *A. leptoceras* Fisch. et Mey., Ind. sem. Horti Petropol. IV (1837) 33; Ldb., Fl. Ross. I, 57; Turcz., Fl. baic.-dah. I, 68. — *A. brachyceras* Fisch. et Mey ex Turcz. in Bull. Soc. Nat. Mosc. XI (1838) 86, nom. nud.; Maund. Bot. Gard. No. 755. — Ic.: Bot. Reg. XXXIII, tab. 64.

91 Perennial; stem 20–30 cm high, either glabrous or stem and petioles of radical leaves slightly pubescent, the petioles glandular; leaves thin, green, glabrous, glaucous beneath; leaflets of radical leaves orbicular-cuneate, lobate, 1.5–2 cm long, slightly longer than broad; cauline leaves 1 or several, ternate, with narrow lobes; pedicels glabrous or glandular. Flowers lilac-blue, limb of petal bluish or whitish yellow-margined; sepals elliptic or oblong, more or less spreading, 1.8–2.5 cm long, ca. 1.2 cm broad; petals 2.5–3 cm long, ca. 0.7 cm in their broadest part; limb 1–1.2 cm long; stamens slightly longer than corolla, styles even longer; follicles 2 cm long, glabrate or sparsely glandular, diverging toward apex; seeds slightly lustrous, black. July. (Plate VII, Figure 9).

Mountain forests. — E. Siberia: Dau (E.). Described from Transbaikalia. Type in Leningrad; cotype in London.

3. *A. borodinii* Schischk. in Melang. bot. offerts à Mr. J. Borodin a l'occasion de son jubilé (1927) 305. — *A. sibirica* Schischk. Skizzen d. Urjanchai Land (1914) 182, non Lam. — Ic.: In Melang. bot. (1927) 305.

Perennial; stem 20–40 cm high, lower part of stem and entire petioles covered with very sparse short spreading hairs; leaves glaucescent beneath, biternate, radical leaves with petioles 7–15 cm long, the petioles of cauline leaves 1–5 cm long; leaflets orbicular-obovate, ca. 1.5 cm long, 1.5–2.5 cm broad; middle leaflet usually trilobate, lateral leaflets bilobate, entire or dentate. Flowers nutant on arcuately recurved pedicels distally covered with dense short glandular hairs; sepals lilac-blue, ovate acute, 1.5–2.2 cm long, 0.6–1 cm broad; petals whitish, 2.5 cm long, 0.5 cm broad, limb half as long as the sepals, apex obliquely rounded or truncate; spur 1.5 times as long as the limb, straight, the tip obliquely curved; carpels 5, with long styles; when immature covered with short accumbent hairs. June–August. (Plate VII, Figure 12).

Stony taluses and rocks; in the alpine zone at 1,600–2,500 m. — W. Siberia: Alt.; E. Siberia: Ang.-Say. Endemic. Described from the Sayan Mountains (Mirskoi and Bol'she-Oiskii ranges). Type in Tomsk; cotype in Leningrad.

Note. Flowers most closely resembling *A. leptoceras* Fisch. et Mey. from which it is distinguished by its smallness, its pubescent pedicels and follicles, and its graceful slender spurs.

Series 3. *Orthoceras* Bul. — Glabrous or glandular-pubescent plants. Flowers 2.5–5 cm in diameter, inverted or else lateral flowers with long slender upward-pointing spurs and strongly exserted stamens or styles. Follicles 3–5, small, with curved styles.

4. *A. viridiflora* Pall. in Nova Acta Acad. Petr. II (1779) 260, tab. 11, f. 1; Ldb., Fl. Ross. 1, 57; Turcz., Fl. baic.-dah. 1, 70. — *A. atropurpurea* Willd., Enum. Hort. Berol. (1806) 577. — *A. dahurica* Patr. in Deless., Ic. Sel. 1 (1820) tab. 49. — Ic.: Pall., l.c.

Perennial; stem 25–40 cm high, branched in upper part, glabrous or glandular-pubescent, generally entire plant glabrous; leaves long-petioled, leaflets glaucous cuneate, trilobate, dentate, 1.5–2 cm long, 1.2–3 cm broad. Flowers greenish yellow or brownish red or dingy blue, resembling an inverted funnel, 2.5 cm in diameter, with upward-pointing straight or slightly crooked spurs; sepals ovate or oval-lanceolate, 1.5–2 cm long, 0.7–1 cm broad; petals 3 cm long, with spur (1.5–1.7 cm long) equal or subequal to limb; limb broad, truncate; carpels (3)–5; styles longer than or as long as ovary; follicles generally glabrous, 1.5 cm long; young seeds lustrous, green. May–August. (Plate VII, Figure 8).

Rocks. — E. Siberia: Dau.; Far East: Ze.-Bu. Gen. distr.: Mong., China, Japan. Described from Dauria. Type in Leningrad; cotype in London.

Note. On the basis of flower color, shape of sepals (subacute in the former, obtuse in the latter), and length of spurs (shorter in the latter). Ledebour and Turchaninov recognized two independent species: *A. viridiflora* Pall. and *A. atropurpurea* Willd. Available material is insufficient for the establishment of these species, whose ranges overlap to a considerable extent, both phenologically and ecologically, nor is there sufficient material to determine the exact limits of these areas of distribution.

5. *A. lactiflora* Kar. et Kir. in Bull. Soc. Nat. Mosc. XIV (1841) 374; Ldb., Fl. Ross. I, 737; Fisch. et Mey. in Schrenk, Enum. plant. nov. II, 70. — *A. moorcroftiana* var. *lactiflora* Bruhl in Journ. Asiat. Soc. LXI (1892) 310. — *A. moorcroftiana* var. *lactiflora* f. *typica* Korsh. in Bull. Ac. Sc. Petersb. sér. V, IX (1898) 401. — *A. darvasii* Korsch., ibid. — Exs.: Soc. Imp. Nat. Cur. Mosq. No. 58; H. F. A. M. No. 127.

Perennial; stem 40–80 cm high, stem and leaves glandular-pubescent; radical leaves biternate, rarely imparipinnate; leaflets of radical leaves rounded-cuneate, more or less deeply segmented, ca. 1 cm in length and breadth (leaflets smaller in var. *microphylla*), firm, glaucous or gray or white-tomentose beneath; cauline leaves tripartite. Pedicels glandular-pubescent; flowers mostly densely pubescent, 5 cm in diameter, milk white (var. *leucantha* Fisch. et Mey.) or rarely pink, or else sepals and spurs pale lilac, limb of petal white or yellow (var. *dichroantha* Fisch. et Mey.); sepals 1.8–2.5 cm long, lanceolate, distant, ciliate; petals ca. 3 cm long; spur narrow, 2 cm long or more, straight or only slightly recurved at the tip, 2 or more times as long as spatulate limb of petal; stamens slightly exserted from corolla; carpels 5, glandular-pubescent, with long distant styles; follicles also glandular-pubescent, ca. 1.5 cm long; seeds lustrous, black. From mid-May to July, inclusive. (Plate VII, Figure 6).

Ravines, beside rivulets in subalpine meadows, near glaciers, rock streams, upper limit of broadleaf trees, lower regions of conifers (spruce), juniper and birch woods at 1,600–3,050 m. — Centr. Asia: Dzu.-Tarb., T. Sh., Syr-D., Pam.-Al. Endemic. Described from Tarbagatai. Type in Moscow; cotype in Leningrad.

Series 4. *Vulgares* Bul. — Relatively large plants, branched, more or less pubescent with leafy stems; pedicels glandular; leaves thin; flowers 2.5–8(10) cm in diameter, either monochromatic: blue, red, pink, lilac, or white, or else bicolored: blue and red, with a white or yellow or straw-colored limb; floral envelopes slender, readily marcescent. Carpels 5–8; ripe follicles 2–4 cm long.

6. *A. oxysepala* Trautv. et Mey., Fl. Ochot. (1847) 10. — *A. vulgaris* var. *staminodiis planis, petalis albis* Maxim. Prim. Fl. Amur. (1859) 22. — *A. vulgaris* var. *oxysepala* Rgl. Tent. Fl. Ussur. (1862) 9. — Ic.: Kom. and Alis., Opred. rast. Dal'nevost. kraya I, 530, pl. 161, figs. 1–3. — Exs.: Karo, Pl. amur. et zeaen. No. 400.

Perennial; stem 70–100 cm high; leaflets orbicular or rhombic or broad-obovate or oval-cuneate, dentate, 3–5 cm long and 2–3.5 cm broad; upper cauline leaves acute, elongated; flowers 2.5–3.2(5) cm in diameter; sepals wine red or violet or rarely white, broad-lanceolate, longer than limb of petal, distant, 2.5(3) cm long, 1–1.2 cm broad; petals 3.3 cm long, ca. 1 cm broad, with incurved spurs concolor with sepals; limb of petal yellowish straw colored, truncate; stamens scarcely exerted from corolla; styles visible; ripe follicles ca. 4 cm long, pilose, with short curved styles; seeds black with minute scarcely discernible dots. May–August. (Plate VII, Figure 1).

Banks of rivulets and streams in mixed forests, forest margins clearings and grass plots. — Far East: Okh. (S.), Ze.-Bu., Uda, Uss. **Gen. distr.:** N. Japan, N. Korea, Manchuria, China (Chihli [Hopeh]). Described from the Uda River area. Type in Leningrad.

7. *A. karelini* (Baker) O. et B. Fedtsch., Ranunc. Turkestana (1899) 65. — *A. vulgaris* var. *karelini* Baker in Gard. Chron. II (1878) 76. — *A. kareliniana* C.A.M. ex Trautv. in A.H.P. VIII (1883) 53. — *A. sternbergii* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 135, non Rchb. — Exs.: H.F.A.M. No. 128. — Vernacular name: kara-kogur.

94 Perennial; stem 20–80 cm high, with sparse, partly glandular and partly simple hairs; pedicels densely glandular-pubescent; leaves bipinnate; leaflets lobate, deeply dissected, acute-dentate, rounded at base, glaucescent with sparse hairs beneath, more or less glabrous above, in outline resembling leaves of *A. glandulosa* Fisch. Flowers violet or dark red, ca. 5 cm in diameter; sepals oval acuminate, glandular-ciliate, ca. 2.8 cm long, 1 cm broad; petals ca. 2.5 cm long, 0.9 cm broad, with sparse glandular hairs; limb truncate, about as long as spur; stamens scarcely exerted from corolla; carpels 5, ca. 2.5 cm long when ripe, connate almost to apex, with short distant glabrous styles; seeds small, mostly lustrous. (Mid-May) June–July (August). (Plate VII, Figure 11).

Damp ravines and mountain slopes predominantly covered with spruce and some juniper and broadleaf (apple, aspen) and meadows with tall herbaceous vegetation in the forest and alpine zones at 900–3,660 m; singly or in small groups. — Centr. Asia: Dzu.-Tarb., Syr-D., T. Sh. **Gen. distr.:** Dzu.-Kash. (Kuldja). Described from the Dzungarian Ala Tau. Type in Leningrad.

Economic importance. Sap, obtained from the flowers and slightly diluted with water, is used as an ink in the Aulie-Ata [Dzhambul] area.

8. *A. olympica* Boiss. in Ann. Sc. Nat. 2 sér. XVI (1841) 360; N. Busch in Fl. cauc. crit. III, 3 (1902) 34. — *A. vulgaris* M. B., Fl. taur.-cauc. II (1808) 15; III (1819) 374, non L. — *A. vulgaris* β *caucasica* Ldb., Fl. Ross. I (1842) 56. — *A. caucasica* M. B. ex Rupr., Fl. Cauc. (1869) 32, 287. — Ic.: Rev. Hort. 108. — Exs.: Fl. cauc. exsic. No. 106; Herb., Fl. cauc. No. 215.

Perennial; stem 30–60 cm high, in upper part mostly branched, glandular, slightly glutinous, with densely glandular-pubescent pedicels, in the remaining parts glabrous or with scattered sparse hairs; shape of leaves resembling *A. vulgaris*; leaflets large, oval-cuneate, grayish beneath, obtusely large-lobed. Flowers 5–8(10) cm in diameter, blue, rarely pink, limb of petal white, pubescence of small simple hairs; sepals 2–4.5 cm long, 1–2 cm broad, ovate acute, considerably longer than limb of petal, declinate; petals to 3.5 cm long, limb obtuse; spur 1–2 cm long, about as long as the limb, hamately curved with long sparse glandular hairs at the tip; stamens about as long as limbs of petals; carpels 5–8, slightly glandular-pubescent, 2–3 cm long; styles recurved; seeds black, dull, very finely regulose. May–July (August). (Plate VII, Figure 7).

Broadleaf, mixed, and coniferous (pine) forests, groves, scrub, meadows, subalpine slopes in the forest, and especially the subalpine zones of the entire Caucasus at 1,220–3,645 m. — Caucasus: Cisc., Dag., W., E., and S. Transc. Gen. distr.: As. Min., Iran. Described from Mount Olympus. Type in Geneva.

9. *A. vulgaris* L., Sp. pl. (1753) 753; Ldb., Fl. Ross. I, 55; Shmal'g., Fl. I, 27. — *A. silvestris* Neck., Delic. Gallo-Belg. I (1768) 234. — *A. cornuta* Gilib., Fl. lithuan. V (1782) 286. — *A. versicolor* Salisb., Prodr. (1807) 374. — Ic.: Rchb., Ic. Fl. Germ. IV, tab. 114. — Exs.: Meinsh., Herb. Fl. Ingr. No. 25.

Perennial; stem 30–70 cm high, branched in upper part, glabrous or pubescent, pedicels glandular; leaves pubescent, lighter-colored beneath than above, sometimes glaucescent; radical leaves long-petioled, biternate; leaflets orbicular-cuneate, lobate, more or less crenate, 2.5–5 cm long, 1.5–2 cm or more broad; cauline leaves short-petioled, similar to the radical, the upper leaves tripartite. Flowers blue, lilac, pink, red, rarely white with scattered hairs, ca. 4–5 cm in diameter; sepals ovate or oval-lanceolate, ciliate, prostrate, 1.5–2.5 cm long, ca. 1 cm broad; petals obtuse, slightly emarginate, ca. 3 cm long, ca. 1 cm in the broadest part; spurs thick, with a terminal thickening, recurved in the form of a hook or incurved, twice as long as the limb, the latter slightly shorter than or as long as the stamens; carpels 5–8, short-pubescent, glandular, fruitlets ca. 2 cm long, glabrous or pubescent; styles glabrous, almost straight; seeds black, lustrous. End of May, June, July. (Plate VII, Figure 10).

Wild in parks, forests, and meadows adjacent to old farms; sometimes in deep sand beneath willows and European alders; usually in elevated, open or shaded places; scattered or single. — European part: Kar.-Lap. (S.), Dv.-Pech. (single specimen), Lad.-Ilm., U. V., V.-Kama, U. Dnp., M. Dnp., V.-Don, Bl., Crim. (single specimen), L. Don. Gen. distr.: Scand. (S.), Centr. and S. Europe, introduced into North America. Described from Europe. Type in London.

Note. The primary range of this species is in Western Europe, where the plant is rather widespread in forests and lowland meadows; it has spread far beyond these limits, partly by natural means, but mainly through horticulture, reaching far eastward into the plains of the USSR, i. e., the secondary part of its distribution range. In Western Europe it grows on mountains to 2,000 m.

Economic importance. A poisonous plant, avoided by livestock, but widely distributed in gardens as a readily cultivable, ornamental plant. It is represented by several varieties; the spurless and double-flowering forms are particularly beautiful.

Series 5. **Glandulosae** Bul. — Flowers 6–10.5 cm in diameter, blue or with petal limb yellowish, flowers rarely white, nutant until flowering, campanulate, at flowering stellately spreading; spurs short, proximally thickened; stamens short, carpels 6–15, together with pedicels densely glandular-pubescent.

96 10. **A. glandulosa** Fisch., ex Link, Enum. Hort. berol. II (1822) 84; Ldb., Fl. Ross. I, 56; Turcz., Fl. baic.-dah. I, 69; Kryl., Fl. Zap. Sib. V, 1133. — **A. alpina** var. **grandiflora** DC., Syst. I (1818) 337. — **A. jucunda** Fisch. et Lallemand, Ind. sem. Horti Petropol. VI (1840) 2. — Ic.: Sweet., Brit. Fl. Gard. II, tab. 55. — Exs.: Herb. Soc. Imp. Nat. Cur. Mosq. No. 597.

Perennial; stem simple or slightly branched in upper part, 12–35(60) cm high, glabrate, pedicels densely glandular-pubescent; radical leaves biternate; leaflets orbicular, broadly cuneate or orbicular-obovate, 1–2.5 cm long, 1.5–3 cm broad, trifid, rounded-dentate; cauline leaves small, tripartite, with oblong or linear entire lobes. Flowers solitary or 2–3, terminal, brightly colored, occasionally greenish or whitish along margins; sepals ovate or elliptic, usually longer than petals, 3–5 cm long, 1.5–3 cm broad, blue; petals blue or yellowish, the limb 2–4 times as long as the spur, spur 0.6–1 cm long, recurved in the shape of a hook; stamens as long as the pubescent carpels, not exerted; ripe follicles 8–10, ca. 2 cm long, with volute styles, covered with a dense down; seeds black, without luster. June to mid-August. (Plate VII, Figure 5).

Alpine meadows, rock streams, rocks, rarely banks of mountain rivulets; found to below the timberline. — W. Siberia: Alt.; E. Siberia: Ang.-Say, Dau.; Centr. Asia: Dzu.-Tarb., T. Sh. **Gen. distr.:** Dzu.-Kash.; NW Mong. Described from Altai. Type in Leningrad.

Series 6. **Sibiricae** Bul. — Low growing glabrous or glabrate plants with leafless or slightly leafy stems; leaves more or less glaucous, rarely pilose; flowers lilac blue, rarely white, 2.5–6(7) cm in diameter, petals with white or yellowish limb; sepals oval or oblong; spurs hamately recurved; floral envelopes slightly fleshy; pedicels glabrous or sparsely hairy; carpels 4–8, glabrous, ripe ovary 1.5–4.5 cm long.

11. **A. sibirica** Lam., Dict. I (1783) 150; Ldb., Fl. Alt. II (1830) 296; Turcz., Fl. baic.-dah. I, 68; Kryl., Fl. Zap. Sib. V, 1134. — **A. bicolor**

Ehrh. Beitr. VII (1793) 146. — Ic.: Gartenfl. IX (1860) tab. 289. — Exs.: HFR No. 552, (sub. *A. sibirica* β *discolor* Turcz.).

97 Perennial; stem 26–70 cm high, slightly branched, upper part of stem and entire petioles covered with short sparse hairs, rarely whole stem glabrous; radical leaves often simply ternate, not biternate as in other species of *Aquilegia*; leaflets 2–4.5 cm long, 3–6 cm broad, glaucescent beneath; flowers 5–6(7) cm in diameter; sepals lilac-blue, rarely almost white, 2–7 cm long, 1–2 cm broad, recurved or prostrate; petals 3 cm long; spur concolor with calyx (var. *concolor* Rgl.), ca. 2 cm long, tip recurved in the shape of a hook or annularly volute; limb of petal obtuse or obliquely truncate, frequently whitish (var. *discolor* Rgl.), ca. 1 cm long; styles slightly longer than or as long as stamens; follicles 5, glabrous, ca. 2.5 cm long; flowers with characteristic scent. May–June–July (August). (Plate VII, Figure 3).

Dry-valley meadows in forests, rarely floodplains and subalpine meadows at 1,600–1,760 m, meadow slopes, stony slopes, and sparse mountain forests (larch, pine, spruce, stone-pine, and mixed). — W. Siberia: Ob (SE), Irt., Alt.; E. Siberia: Yenisei (S. and SE), Lena-Kol., Ang.-Say., Dau.; Centr. Asia: Dzu.-Tarb. **Gen. distr.:** N. and NW Mong. Described from Siberia. Type in Paris.

12. *A. amurensis* Kom. in Notul. system. ex Herb. Horti Bot. Petropol. VI, 1 (1926) 8. — *A. flabellata* var. *alpina* Kuzen. Bull. Ac. Sc. (1915) No. 5, 4.

Perennial; stem 20–50 cm high, branched in upper part, with slightly pubescent, rarely glabrous pedicels; radical leaves long-petioled; leaflets trifid or lobate, dentate, orbicular-cuneate, thin, glabrous or appressed-hairy beneath; single cauline leaf short-petioled; flowers 2.5–5.5 cm in diameter, lilac-blue, rarely white (var. *albiflora* Bul.), corolla 2–3 cm long, the limb considerably shorter than the calyx, pale yellow or white; sepals 2–3.5 cm long, 1–2 cm broad; carpels 4–8, ripe ovary 1.5–3 cm long; styles long, divergent at maturity, seeds black with slight luster. May–June (August). (Plate VII, Figure 13).

Rock outcrops in the mountain-forest zone balds (1,400 m). — E. Siberia: Lena-Kol. (E. slopes of the Stanovoi Range); Far East: Okh., Ze.-Bu., Uda. **Gen. distr.:** Korea. Described from the Far East. Type in Leningrad.

13. *A. flabellata* Sieb. et Zucc., Fl. jap. fam. nat. I (1846) 75. — Ic.: Rev. Hort. (1887) 548. — Vernacular name: Khikatakina (Ainu).

Perennial; stem 40–60 cm high, with sessile leaves; entire plant glaucous, glabrate, the pedicels with very sparse glandular hairs; radical leaves long-petioled, biternate or quaternate; leaflets flabellate with sharply outlined venation, firm, intensely glaucous beneath, unequally incised-dentate, teeth rounded; flowers 4.5–5.5 cm in diameter, glabrous or sparsely hairy, lilac-blue, rarely white; sepals oblong or broad-ovate, 1.5–2.5 cm long, 1.1–1.7 cm broad; spurs long with thickened base and reflexed tip, but spurs short in the white variety; limb straight, yellow, campanulate, as long as sepals; stamens not exerted; carpels 5, with divergent styles glabrous, ripe ovary 2–4.5 cm long; seeds black, lustrous. June–July. (Plate VII, Figure 4).

Mountain forests.— Far East: Sakh. Gen. distr.: N. Japan, Kurile Islands. Described from Japan. Type in Munich; cotype in Leningrad.

98 Note. This species is very close to *A. amurensis*, from which it is distinguished by the very long limb, the rounded-tipped sepals, firm intensely colored flabellate leaflets (though these do not always retain this shape), with abaxially prominent veins beneath, and by the rather lustrous seeds.

Series 7.* *Colchicae* Bul.— Glandular-glutinous; flowers 3–5 cm in diameter, blue, with a white limb; spurs long, hamately recurved or almost spirally involute. Carpels 5, small, glabrous or sparsely hairy.

14. *A. colchica* Kemularia-Natzhadze, Tr. Tifl. Bot. Inst. I (1934) 113.

Perennial; rootstock thick, long, the numerous ascending stems simple or divaricately branched in upper part, crowded with leaves, glandular-pubescent. Lower leaves numerous, biternate, long-petioled, with a soft dense grayish-whitish pubescence, especially above; leaflets rounded, cuneately obovate, irregularly and coarsely crenate, sessile or central leaflet short-petioled. Flowers** on long glandular-glutinous pedicels, 3–15 per stem; sepals blue, lanceolate or narrowly ovate with a greenish tip, twice or 1.5 times as long as the almost squarely truncate limb; spur with greenish thickened tip; carpels as long as stamens; follicles with styles curved to the side, densely pubescent when young. Mature seeds black, lustrous, slightly rugose. July–August.

Calcareous rocks in the forest zone.— Caucasus: W. Transc. Endemic. Described from the Kvirila River gorge in W. Georgia. Type in Tbilisi.

DOUBTFUL SPECIES

1. *A. formosa* Fisch. in DC., Prodr. I (1824); Ldb., Fl. Ross. I, 56; Bong., Veget. ins. Sitcha 124.

Perennial. "Spurs straight, petal limb very short, stamens much longer than the limb, styles not exerted; sepals lanceolate, much longer than the petals." Flowers red.

Erroneously cited by Fischer and Ledebour for Kamchatka, but it is confined to NW America.

2. *A. hybrida* Sims., Bot. Mag. (18), t. 1221; DC., Prodr. I, 51; Ldb., Fl. Ross. I, 57.— *A. elata* Ldb., Ind. sem. h. Dorpat. pro a. 1824.

99 Perennial. "Spurs straight or with slightly curved tips, longer than the obtuse limb; sepals acute, apically callous, as long as or longer than the limb; stamens somewhat longer than the limb, styles slightly exerted."

Described after a plant grown in the Dorpat [Tartu] Botanical Garden, from seeds obtained somewhere in Dauria. It is difficult to know which species of *Aquilegia* is involved, but presumably it is one of the forms generally known as *A. viridiflora* Pall.

* Received late, and therefore not brought into the proper phylogenetic relation with the other series. As the author has seen neither live plants nor herbarium material, he is unable to suggest its place in the genus.

** According to N. A. Busch; fragrant, smelling like apples.

Genus 524. **DELPHINIUM*** L.**

L., Syst. ed I (1735); Genera pl. ed 5 (1754) 236; Sp. pl. (1753) 530.

Flowers irregular (zygomorphic); tepals 5, petaloid, brightly colored, the upper one prolonged into a hollow spur, the others without spurs; 1-2 distinct nectaries are elongated to spurs, these or the nectaries included in the spur formed by the superior tepal; stamens numerous; fruit of 1 or several (3-5) carpels. Annual or perennial herbs. Up to 200 species in the Temperate Zone. Russian names: zhivokost' or shpornik.

Key to Subgenera

- 1. Nectary 1 (rarely none, petaloid; staminoides absent; fruit a single follicle. Annual herbs; leaves repeatedly ternate, dissected into narrow-linear sections. Subgenus 1. **Consolida** DC.
- + Nectaries 2; below their point of attachment 2 staminoides, one on either side, in the form of smallish petals with a narrow, rather short claw and a more or less deeply incised, rarely entire, limb; fruit of 3-5 follicles. Perennials Subgenus 2. **Eudelphinium** Huth.

Subgenus 1. **CONSOLIDA** DC. — DC., Syst. I (1818) 341. — Genus *Consolida* S.F.Gray, Nat. Arr. Brit. Pl. II (1821) 711. — Sectio *Consolida* Boiss., Fl. Or. I (1617) 74. — Characters appear in the following key.

- 1. Nectary absent. Flowers without spurs 14. **D. paradoxum** Bge.
- + Nectary 1, its spur included in that of the upper tepal 2.
- 2. Lamina of nectary quinquelobate, margin of middle lobe crenulate or scarcely emarginate 3.
- + Lamina of nectary trilobate, the middle lobe more or less slightly emarginate, the lateral lobes very broad, semiorbicular 4.
- 3. Lamina of nectary with lower lateral lobes subobtusely rounded. Spur of upper tepal circinate 1. **D. hohenackeri** Boiss.
- + Lamina of nectary with lower lateral lobes finely cuspidate. Spur of upper tepal slightly curved, not circinate 2. **D. barbatum** Bge.
- 4. Follicles always glabrous 5.
- + Young, usually mature follicles as well, pilose 6.
- 5. Follicles 8-9(10) mm long, only twice as long as broad. Tepals 7-10(12) mm long, 3-6 mm broad, violet-blue or almost violet 4. **D. paniculatum** Host.
- + Follicles (11)12-15 mm long, 3 or almost 3 times as long as broad. Tepals (10)12-16(17) mm long, 5-8 mm broad, bright violet-blue 3. **D. consolida** L.

* From the Greek *delphinion*, a name used by Dioscorides.

** Treatment by S.A. Nevskii; the author considered it necessary to separate *Consolida* as a distinct genus, but the editors could not agree with him because, firstly, *Consolida* is commonly referred to the genus *Delphinium* by USSR botanists, and secondly, either *D. consolida* L. or *E. peregrinum* L. are mentioned as the type of *Delphinium* in the international literature (Intern. Rules of Bot. Nomencl., III ed. (1935) 140).

6. Follicles thickest in their lower part, slightly attenuate toward apex, (1.2)1.5–2.7 cm long, 4–6.5 mm broad 7.
- + Follicles terete or laterally compressed, not attenuate toward apex, with one side tapering into a beak; however, in some species follicles broader in their upper part, usually shorter and more slender 8.
7. Flowers blue or pale pink or rarely white. Spur of upper tepal 1.5–1.6 cm long. Beak of follicle 2.5–2.75 mm long 6. *D. ajacis* L.
- + Flowers usually bright purple-violet. Spur of upper tepal 0.8–0.9 cm long. Beak of follicle 1–1.5 mm long 7. *D. orientale* J. Gay.
8. Pedicels extremely short, considerably longer than, rarely as long as flowers and fruits 9.
- + Pedicels all considerably shorter than flowers and fruits, usually not longer than 5 mm (2–5 mm) long 11.
9. Flowers bluish violet or almost violet. Follicles 8–10(13) mm long, 3–3.5 mm broad, oblong-obovate, slightly compressed 5. *D. divaricatum* Ldb.
- + Flowers pale pink, turning more or less azure on drying. Follicles 10–18 mm long, 2–3 mm broad, scarcely compressed 10.
10. Upper lateral tepals orbicular-obovate, 0.9–1.3 cm long, (0.6)0.7–1.1 cm broad, Flowers an intense azure when dry 8. *D. camptocarpum* Fisch. et Mey.
- 101 + Upper lateral tepals obovate, 0.9–1.2 cm long, (0.4)0.5–0.6 cm broad. Flowers slightly azure when dry, sometimes not becoming azure 9. *D. songoricum* Nevski.
11. Follicles (excluding beak) 0.7–1.3 cm long, slightly compressed, with stalks one-third to one-half this length 12.
- + Follicles (1.2)1.5–2.5 cm long, terete, with stalks not exceeding one-fourth their length 13.
12. Flowers pinkish lilac when dry. Spur 1.5–2 cm long, 2.5–2.75 mm wide at base 11. *D. persicum* Boiss.
- + Flowers whitish-pinkish; the same color when dry. Spur 2–2.5 cm long and 4 mm wide at base 12. *D. stocksianum* Boiss.
13. Follicles slenderly terete, 1.7–2.5 cm long, 2–2.5 mm broad. Bracts shorter than flowers and fruits . . . 10. *D. leptocarpum* Nevski.
- + Follicles terete, (1.2)1.5–1.8(2) cm long, 3–4(5) mm broad. Bracts longer than flowers and fruits 11. *D. rugulosum* Boiss.

1. *D. hohenackeri* Boiss., Fl. Or. I (1867) 85. — *D. anthoroideum* Boiss. in Ann. Sc. Nat. (1841) 369, pro parte. — *D. aconiti* Hohenack., Enum. Talysch. (1838) 147; Ldb., Fl. Ross. I, 59, non L. — *Consolida hohenackeri* Grossh., Fl. Cavk. II (1930) 101. — Ic.: Huth, Monogr. Gatt. Delph. in Engl. Bot. Jahrbüch. XX (1895) tab. VI, f. 1. — Exs.: Fl. cauc. exs. No. 178.

Annual; pubescence short, appressed; stems 15–75 cm high, divaricately branched, the branches elongated; leaves bi- or triterately dissected into narrow-linear puberulent lobules; flowers pale lilac-azure, tepals 7–8 mm long, 3.5–4 mm broad, oblong-obovate, obtuse, slightly pubescent dorsally, the upper tepal with a very small limb, only 2 mm long and a large distally circinate spur, together 1.2–1.3 cm long and to 4 mm thick; lamina of nectary quinquelobate, more or less pinkish violet, with extremely large, rounded outer lobes close to base; follicle with a longish beak, glabrous,

8-9mm long, 3.5-4mm broad. Seeds grayish brown, bearing rows of scales. June-August. (Plate VIII, Figure 8).

Dry foothill slopes; rarely cultivated and fallow fields. - Caucasus: E. Transc., Tal., W. Transc. (S.). **Gen. distr.:** Arm.-Kurd., Iran., As. Min. Described from Zuvant. Type in Geneva; cotype in Leningrad.

102 2. *D. barbatum* Bge. in Arbeit. d. naturforsch. Vereins z. Riga I (1848) 127. - *Consolida barbata* Schröding. in Abhandl. Zool.-bot. Gesellsch. Wien, IV, 5 (1909) 16, 62.

Annual; stem divaricately branched, slender, 30-50(60) cm high, more or less appressed-pubescent; leaves bi- or triterately dissected into narrow-linear pubescent lobules. Bracteoles oblong-linear, appressed, short; pedicels many times as long as the bracteoles, densely covered with spreading hairs and bright yellow glandular hairs (in the type) or else with appressed hairs (var. *adpresso-pilosum* Lipsky); flowers pale azure or rarely lilac-azure; tepals elliptic-lanceolate or lanceolate, obtuse, 6-7mm long, 2.5-3.5mm broad, dorsally covered with more or less appressed hairs and sometimes also with yellow glands; upper lateral tepals bearing near their apex, mainly on the side, tufts of long white tangled hairs; superior median tepal lanceolate, rather obtusely acuminate, 3.5-6mm long, ca. 2mm broad, spur curved 1-1.2 cm long as measured from pedicel or 0.7 cm long from base of tepal limb; lamina of nectary quinquelobate, with lanceolate or broad-lanceolate long-cuspidate lower lateral lobes, triangular-ovate obtuse upper lateral lobes, and a broad, crenulate middle lobe with very prominent violet veins; anthers azure-violet; follicle glabrous, with longish beak, with broadened above the middle, 0.6-0.9 cm long, 3mm broad. June-July (October).

Semidesert foothill slopes. - Centr. Asia: T. Sh. (W.), Syr D., Pam. - Al. (W.). Endemic. Described from the Karatau Mountains. Type in Paris; cotype in Leningrad.

3. *D. consolida* L., Sp. pl. (1753) 530; Ldb., Fl. Ross. I, 58, p. pte; Shmal'g., Fl. I, 28, p. pte; Kryl., Fl. Zap. Sib. V, 1136. - *D. segetum* Lam., Fl. France VIII (1778) 325. - *Consolida segetum* Schur, Verh. Sieb. Nat. Ver. IV (1853) 47. - *C. regalis* S.F. Gray, Nat. Arr. Brit. Pl. II (1821) 711. - *Delphinium monophyllum* Gilib., Fl. Lithuan. II (1781) 287. - *D. versicolor* Salisb., Prodr. (1796) 375. - *D. diffusum* Stokes, Bot. Mag. Mus. III (1812) 213. - *Consolida arvensis* Opiz, Sezn. (1852) 32. - Ic.: Fl. Dan. Tab. 685. - Exs.: HFR No. 1102. - Russian names: zhivokost' polevaya [field], sokirki, rogaye vasil'ki, grabel'ki, rogul'ki, toporiki, komarovy nosiki, komarovy nogi.

103 Annual; glabrous or slightly pubescent; stem divaricately branched in upper part, rarely - in impoverished forms - almost simple, 25-50(70) cm high; leaves bi- or triterately dissected into narrow-linear lobules, 1-3.5 cm long, 0.5-2mm broad, the lower borne on petioles shorter than or about as long as the blade, the upper smaller and sessile. Bracteoles short, more or less appressed-pilose; flowers bright violet, very rarely pale azure or pale pink or white; tepals (10)12-16(17)mm long and 5-8mm broad, oblong-obovate, obtuse with short somewhat sparse appressed down on the outside, spur of upper tepal 14-18(20)mm long. Lamina of nectary in the form of a shallowly and obtusely trilobate petal tapering into a hollow spur that is included in spur of upper tepal and colored violet-azure, its

middle lobe narrow, apically emarginate, its lateral lobes broad, semi-orbicular; follicle glabrous, (11)12–15 mm long, 3 or almost 3 times as long as broad; seeds covered with transverse rows of short scarios scales. June–July. (Plate VIII, Figure 6).

Fields (particularly rye fields); rarely a roadside weed. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. Dnp., V.-Don, M. Dnp., Bl., L. Don; Caucasus: Cisc.; W. Siberia: U. Tob., Ob. Irt. **Gen. distr.:** Scand. (S.), Centr. Eur., W. Med., Bal.-As. Min. Introduced into N. Am. Described from Europe. Type in London.

Economic importance. Nectariferous; infusion of the leaves with alum provides a fine blue dye for wool and silk, as well as ink; the powdered poisonous seeds serve as an insecticide; ornamental.

4. *D. paniculatum* Host, Fl. Austr. II (1831) 65; Huth in Engler, Bot. Jahrbüch. XX (1895) 384. — *D. consolida* β *micranthum*. Boiss., Fl. Or. I (1867) 78. — *D. consolida* var. *sparsiflorum* Vis., Fl. Dalm. III (1852) 89. — *D. consolida* var. *paniculatum* Aschers. et Kanitz, Catalogus pl. Serb. (1877) 73. — *D. consolida* ssp. *paniculatum* N. Busch. in Fl. Cauc. crit. III, 3 (1903) 44. — *D. consolida* M. B., Fl. taur.-cauc. II (1808) 11, non L. — *Consolida paniculata* Schur in Verh. Sieb. Nat. Ver. IV (1853) 47; Huth in Engl., Bot. Jahrb. XX (1895) 384. — *Ceratosanthus paniculatus* Schur in Verh. Sieb. Nat. Ver. IV (1853) 46. — Ic.: Rchb., Ic. Fl. Germ. IV (1840) tab. 66 (sub nomine *D. divaric.*). — Exs.: Sintenis. It. Or. 1892, No. 4294.

Annual; stem (30)50–120 cm high, very profusely divaricately branched in its upper part, appressed-pilose or glabrate; leaves repeatedly (1)2–3-ternately dissected into narrow-linear, more or less pilose lobules; bracts and bracteoles entire; pedicels many times as long as the bracteoles, appressed-pubescent or glabrate; flowers violet-blue, the violet more intense than in *C. consolida*, flowers shorter than in the latter; tepals 7–10(11) mm long, 3–6 mm broad, oblong-ovate, obtuse, rather densely short-pilose on the outside, spur 14–17 mm long; nectary trilobate, the middle lobe narrow, apically emarginate, lateral lobes broad, orbicular, more or less violet-lilac; follicle glabrous, 8–9(10) mm long, twice as long as broad. June–August. (Plate VIII, Figure 7).

Steppes, steppe slopes, stony slopes, and rarely in weed-infested places. — European part: Bl., L. Don, L. V., Crim.; Caucasus: Cisc., W. Transc., Dag., Tal. **Gen. distr.:** Centr. Eur. (S.), W. Med. (E.), Bal.-As. Min., 104 Arm.-Kurd. Described from Dalmatia. Type in Vienna.

5. *D. divaricatum* Ldb. in Eichw. Pl. Casp. Cauc. (1831) 16; Ldb., Fl. Ross. I, 59; Boiss., Fl. Or. I, 81; Shmal'g., Fl. I, 28. — *D. pubescens* Henning in Mem. Soc. Nat. de Mosc. VI, p. 73 et 897, non DC. — *Consolida divaricata* Schrödinger in Abhandl. Zool.-bot. Ges. Wien IV, 5 (1909) 62; Hayek, Prodr. Fl. penins. Balc. I (1924) 315. — Ic.: Eichw., l. c., tab. 16.

Annual; stem to 75 cm high, with divaricate branches bearing few long-pedicelled flowers, glabrous below, more or less pubescent higher up; leaves repeatedly dissected into narrow-linear pubescent lobules; pedicels many times longer than the linear bracts and bracteoles, below the flower more

or less appressed- or spreading-pubescent at base usually bearing utriculately broadened yellowish hairs in addition to simple hairs; flowers bluish violet or almost violet; tepals 10-12(15)mm long to 6mm broad, oblong-obovate obtuse, pubescent on the outside, spur 20-25mm long, 2-3mm wide at base; nectary more or less lilac-violet, the middle lobe narrow, apically emarginate, 4-5mm long (slightly longer than in *D. consolidida*); the lateral lobes broad, semiorbicular; follicle appressed-pilose, straight or slightly recurved, 8-10(13)mm long, 3-3.5mm broad, oblong-obovate, slightly compressed. June-August (September-October). (Plate VIII, Figure 5).

Dry steppe slopes, sandy places, and cultivated fields. — European part: L. V., Crim.; Caucasus: Cisc., Dag., E. and S. Transc., Tal.; Centr. Asia: Ar.-Casp. (Aleksandrovsk), Syr D. (introduced). **Gen. distr.:** Iran, Bal.-As. Min. Described from islands in the Volga Delta. Type in Leningrad.

6. *D. ajacis** L., Sp. pl. (1753) 531; N. Busch in Fl. cauc. crit. III, 3, 41. — *D. ambiguum* Mill., Dict. ed. 8 (1768) No. 3. — *D. simplex* Salisb., Prodr. (1796) 375. — *D. addendum* Mc.Nab. in Transact. Bot. Soc. Edinb. IX (1868) 335. — *Consolidida ajacis* Schur in Verh. Sieb. Nat. Ver. IV (1853) 47. — *Ceratosanthus ajacis* Schur, Enum. pl. Transs. (1866) 30. — Ic.: Rchb., f., Fl. Germ. IV, Tab. 67.

Annual; stem 30-100 cm high, divaricately branched, appressed-pubescent; leaves repeatedly ternately dissected into narrow-linear lobules; lower bracts palmately dissected into linear lobules, bracteoles small, linear, distant from base of flower; pedicels appressed-pubescent, with white hairs sometimes utriculately broadened and yellowish at their base; flowers disposed in loose or rather dense racemes, intensely azure or pale pink, rarely whitish, the upper tepal and lower lateral tepals lance-ovate, 12-15 mm long, 5-6 mm broad, the upper lateral tepals rounded-ovate, 1-1.2 cm broad, tapering at base into a short claw; all tepals slightly pubescent on the outside; spur almost straight, 1.5-1.6 cm long, ca. 2-2.25 mm thick at base, slightly longer than the upper tepal; nectary large, together with the lamina 1.3-1.6 cm long, as measured from base of spur, trilobate, the middle lobe oblong, 7-8 mm long, apically emarginate, concolor with the tepal; the lateral lobes broad, semiorbicular or rounded-triangular, obtuse; follicle usually 1.5-2 cm long, with a dense pubescence of more or less distant yellow hairs utriculately broadened at base; follicle unilaterally produced into a short beak 2.5-2.75 mm long, margins of suture very slightly thickened; seeds black, trigonous, covered with small scales. June-July.

A rare weed accidentally introduced into truck gardens and cultivated fields and also growing near buildings. — European part: Crim.; Caucasus: Cisc., Dag., Tal.; Centr. Asia: Kara K. (Merv). **Gen. distr.:** W. Med. (Provence, stony slopes), Centr. Eur. (S.), Bal.-As. Min. Introduced into India and N. Am. Described as a garden plant of unknown origin. Type in London.

* From the name of the Greek hero Ajax; legend has it that from his blood grew a flower, and its shape resembled the first letter of his name.

7. *D. orientale* J. Gay apud Demoulins, Cat. Dordogne (1840) 12. — *D. ajacis* M.B., Fl. taur.-cauc. II (1808) 12; Ldb., Fl. Ross. I, 58, non L. — *D. bithynicum* Griseb., Spic. Fl. Rumel. I (1843) 320. — *D. sintenisii* Uechtr. ap. Kanitz, Fl. Roman. (1880) 173. — *D. ajacis* α *orientale* Radde, Grundzüge d. Phlantzverbr. Kauk. (1899) 340. — *D. ajacis* var. *orientale* Finet et Gagnep. in Bull. Soc. bot. France XI (1880) 467. — *D. hispanicum* Willk. et Lange, Prodr. Fl. Hisp. III (1880) 969. — *Consolida orientalis* Schrödinger in Abhandl. Zool.-bot. Ges. Wien IV, 5 (1909) 8, — Ic.: Fiori et Paol., Ic. Fl. Ital. 187. — Exs.: Fl. Austro-Hung. No. 607; Fl. Hung. exs. No. 104; Herb., Fl. Cauc. No. 67; Callier, It. Taur. III, No. 525.

106 Annual; stem erect, 15–50(85) cm high, usually branched, glandular-pubescent in upper part; leaves 2–4-ternately (usually triternately) dissected into narrow-linear pubescent lobules; raceme dense and long, bright purple-violet, lower bracts palmately dissected into narrow-linear lobules, bracteoles entire, approximate to base of flower; pedicels distant, 8–20 mm long, densely short-pubescent and bearing, in addition to the simple hairs, also hairs with a utricularly broadened yellow base; tepals lance-ovate (upper tepal and lower lateral tepals) or suborbicular (the upper lateral), obtuse, slightly pubescent on the outside, 1.2–1.5 cm long and to 1(1.2) cm broad; spur straight or slightly recurved, 8–9 mm long and ca. 1.75 mm wide at base, slightly shorter than the upper tepal; nectary with a lamina 1.4–1.6 cm long (measured from base of spur), trilobate, the middle lobe very narrow, 8 mm long, apically emarginate, the lateral lobes rounded-triangular, obtuse, of same purple-violet color as the tepal; follicle (1.2)1.5–2.7 cm long, more or less densely pubescent, with squarrose hairs, some of these utricularly broadened at base, follicle produced to a very short beak, 1–1.5 mm long, margins of suture thickened; seeds black-brown, covered with very small lamellate scales, confluent into transverse rings. May–July.

Cultivated fields, semidesert and steppe slopes. — European part: Crim.; Caucasus (to 2,000 m); Cisc., Dag., W., E., and S. Transc., Tal.; Centr. Asia: Mtn. Turkm. Accidentally introduced, this species was collected near Lake Baikal; a pink-flowered form was found in the Poltava area. **Gen. distr.:** Bal.-As. Min., Arm.-Kurd., Iran, Ind.-Him., W. Med., Centr. Eur. (S.). Described from Dordogne in S. France. Type in France.

Economic importance. The plant yields a blue dye when extracted without heat and a violet dye when boiled; medicinal; ornamental.

8. *D. camptocarpum* Fisch. et Mey., ex Ldb., Fl. Ross. I (1842) 58 (incl. var. *dasycarpum* Ldb.). — ? *D. cappadocicum* var. *incurvatum* O. Kuntze in A.H.P. X (1887) 144. — *Consolida camptocarpa* Nevski comb. nova. — Exs. H.F.A.M. No. 130.

Annual; stem (9)20–50(60) cm high, sparsely or densely appressed-pubescent, more or less branched almost from base; radical leaves long-petioled, dissected into 3 obovate-cuneate lobes, the middle lobe dissected into 3 linear entire or apically 3-segmented lobules, the lateral lobes into 2 apically (1)2–3-segmented lobules; bracts subsessile decreasingly dissected upward, their lateral lobes may be entire, but the middle lobe very much reduced, linear-subulate; bracteoles very small, entire, usually borne near middle of pedicels, the latter 1–2.5(3) cm long, covered with retrorse appressed hairs; live flowers pale pink; in dry flowers tepals intensely azure,



PLATE VIII. 1 - *Delphinium camptocarpum* Fisch. et Mey.; a) general aspect, b) branch with follicles, c) upper lateral tepal; 2 - *D. leptocarpum* Nevski; 3 - *D. stocksianum* Boiss.; 4 - *D. angulosum* Boiss.; 5 - *D. divaricatum* Ldb.; 6 - *D. consolida* L.; a) follicle, b) nectary; 7 - *D. paniculatum* Host, follicle; 8 - *D. hohenackeri* Boiss., flower.

109 nectary lamina whitish-yellowish, lower lateral tepals lanceolate or oblong-ovate-lanceolate, (0.9)1–1.2(1.5) cm long and 3–3.5(4) mm broad, obtuse, the upper lateral rounded-obovate or suborbicular, (0.6)0.7–1.1 cm broad, the upper tepal similar to the lower lateral, but its limb slightly smaller, spur obliquely ascending, 1.8–2.5 cm long, proximally ca. 2.5 mm thick; follicle with a long stalk, 1.5–2 times as long as or as long as the follicle; stalk more or less curved, hence follicle approximate to inflorescence axis; follicle 1.3–1.8 cm long, 2–3 mm broad, its surface sharply rugose, rather sparsely covered with more or less distant or appressed hairs, rarely glabrous when ripe. April–May. (Plate VIII, Figure 1, a–c).

Stable sands in sandy deserts. – Centr. Asia: Kara K., Amu D. Endemic. Described from SE coast of the Caspian Sea. Type in Leningrad.

9. *D. songoricum* (Kar. et Kir.), Nevski comb. nova. – *Delphinium camptocarpum* β *songoricum* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 136. – *D. camptocarpum* α *turkomanicum* Bge. in Arbeit. d. naturforsch. Vereins z. Riga I (1848) 125. – *D. camptocarpum* δ *robustum* Bge., l.c., 126. – *D. persicum* γ *regelianum* Huth in Engler Bot. Jahrbüch. XX (1895) 370. – *Consolida songorica* (Kar. et Kir.), Nevski comb. nova.

Annual; stem (10)15–40 cm high, rather densely covered with more or less spreading hairs, branched almost from base or below the middle; radical leaves long-petioled, dissected into 3 obovate-cuneate lobes, the middle lobe dissected into 3 linear entire or apically 3-segmented lobules, the lateral into two 2–3-segmented or entire lobules; terminal narrow-linear segments longer and more acute than in *D. camptocarpum*; bracts subsessile, decreasingly dissected upward, their lateral lobes entire and middle lobe reduced, linear-subulate; bracts very small, at middle of pedicels, the latter (0.6)1–2.5(5) cm long, covered with spreading sub-horizontally or slightly recurved hairs, some of these utricularly broadened at base, pedicels considerably longer than the bracts, directed obliquely upward; flowers pale pink when dry, sepals (tepals or perianth segments) whitish-pinkish or slightly azure; nectary lamina whitish yellow; lower lateral tepals lanceolate or lanceolate-oblong-ovate, 1–1.2 cm long, 3–4 mm broad, obtuse; upper lateral tepals obovate, 0.9–1.2 cm long, (0.4)0.5–0.6 cm broad; upper median tepal similar to lower lateral tepals, but its limb slightly smaller, the spur obliquely ascending, 1.7–2 cm long, 2.5–2.75 mm wide proximally; lamina of nectary trilobate, the middle lobe rather narrow and emarginate, the lateral semiorbicular obtuse; follicle with a long, rarely shortish stalk 1.5–2(3) times as long as or as long as, rarely shorter than the follicle, obliquely or arcuately ascending, curved below the follicle; ripe ovary (excluding the 3–4.5 mm long beak) 1–1.5 cm long, 1–3 mm broad, surface sharply rugose, sparsely covered with slightly appressed hairs. Seeds with large whitish lamellate scales. April–May.

Stable sands in sandy deserts and semidesert associations on sandy soil. – Centr. Asia: Balkh., Kyz. K., Ar.-Casp. (E.), Pam.-Al. (NW). Endemic. Described from sands along the Lepsa River. Type in Leningrad.

10. *D. leptocarpum* Nevski in Acta Inst. Bot. Acad. Sc. URSS, Ser. I, 4 (1937). – *Consolida leptocarpa* Nevski, *ibid.* – *Delphinium rugulosum* auct., Fl. turk., p. pte, non Boiss. – *D. persicum* auct.,

Fl. turk., p. pte, non Boiss. — Exs.: HFR No. 2751 (sub nom. *D. persicum*); Sintenis It. transcasp.-pers. 1900–1901 No. 283 (sub nom. *D. rugulosum*).

Annual; stem (10)20–65 cm high, more or less branched below the middle, covered with appressed, rarely spreading hairs; leaves short-petioled, usually triterately dissected, with linear or broad-linear terminal lobes 1.25–2.5 mm broad; bracts as long as or shorter than flowers or fruits, without petioles, less dissected, usually with 3 lance-linear entire or 1–2 dentate or 2–3-lobuled lobes, the middle lobe poorly developed. Bracteoles very small, subulate, distant from base of flower; pedicels short, covered with appressed or rarely squarrose hairs; flowers pale pink, even when dry, but nectary lamina yellowing slightly; tepals 1–1.1 cm long, obtuse, slightly pilose on the outside, lower lateral tepals lanceolate, 3 mm broad, the upper lateral obovate, 5–6 mm broad, the upper median tepal with a small limb-lamina (4–6 mm long), spur upright, almost straight or more or less recurved, 2–2.5 cm long, ca. 4 mm wide proximally; nectary lamina with entire spur included in spur of upper tepal, 1–1.1 cm long, trilobate, the middle lobe ca. 2.5 mm long and ca. 4 mm broad, obtuse, apically emarginate, with conspicuous dark veins and semi-orbicular obtuse lateral lobules 8 mm broad. Follicle with a very short stalk (4.5 mm long, one-fourth the length of the follicle — 1.7–2.5 cm; stalk slenderly terete, 2–2.5 mm broad, erect or slightly curved, appressed-pubescent or rarely with spreading hairs. May–June. (Plate VIII, Figure 2).

Dry stony foothill slopes in the semidesert zone. — Centr. Asia: Pam.-Al. (W.), Mtn. Turkm. Endemic. Described from foothills of the Kugitang Range. Type in Leningrad.

11. *D. persicum* Boiss. in Ann. Sc. Nat. XVI (1841) 362; Fl. Or. I, 76 p. pte; Busch. in Fl. Cauc. crit. III, 3, 40. — *D. camptocarpum* C. Koch in Linnaea, XV (1841) 247, non Fisch. et Mey. — *Consolidapersistica* Schröding in Abhandl. Zool.-bot. Ges. Wien IV, 5 (1909) 17, 62; Grossg., Fl. Kavk. II, 101. — Exs.: Pl. Or. exs. No. 36.

Annual; stem 12–35 cm high, branched below the middle, with appressed or spreading whitish hairs, some of these utricularly broadened and yellowish at their bases; radical leaves short-petioled, with 3 lobes of the first order borne on narrow-linear petioles and dissected into 3 sections or twice bisected, the terminal, narrow-linear (ca. 0.75–1 mm broad) sections, tapering to a cartilaginous mucro; bracts similar to lower leaves but subsessile or sessile, decreasingly dissected upward, usually of 3 narrow-linear entire lobes; bracteoles small, linear-subulate, near base of the very short petioles, these densely covered with more or less distant, more or less appressed hairs; dry flowers pink-lilac, tepals lanceolate obtuse, 0.8–1.1 cm long, 3 mm broad, with appressed hairs in a greenish broad longitudinal band on the outside; upper median tepal 5–6 mm long, spur obliquely ascending, almost straight, 1.5–2 cm long, 2.5–2.75 mm wide proximally; limb of nectary 1–1.1 cm long and very broad, trilobate, with very small narrow middle lobe ca. 2 mm long and extremely broad semiorbicular lateral lobes; follicle with a short stalk usually one-third to half as long as the ovary, slightly compressed laterally, erect, 0.9–1.3 cm long, 2.75 mm broad, with subulate beak 3.5–4 mm long, obscurely rugose and densely pubescent. May–July.

Dry stony foothill slopes in the semidesert zone. — Caucasus: S. Transc., E. Transc. **Gen. distr.:** Arm.-Kurd., Iran. (W.). Described from the vicinity of Hamadan (Iran). Type in Geneva.

12. *D. stocksianum* Boiss., *Diagn. ser. 2*, II (1853) 12; *Fl. Or.* I, 77; Huth in *Engler Bot. Jahrbüch.* XX (1895) 373. — *D. persicum* var. *ferganense* Korsh. in *herb. Inst. Bot. Ac. Sc. URSS.* — *Consolida stocksiana* Nevski comb. nova.

112 Annual; stem (12)20–50(70) cm high, slightly branched in lower half or near the middle, with long slender virgate branches, with dense appressed, rarely more or less spreading hairs; leaves usually tritermately dissected into narrow-linear pilose lobules, not more than 0.75–1.25(1.5) mm broad; bracts similar to lower leaves but less dissected, appressed to stem, shorter than flowers but as long as or longer than follicles; bracteoles very small, entire, distant from base of flower; pedicels extremely short, densely covered with more or less squarrose hairs; flowers whitish-pinkish even when dry but nectary lamina yellowing slightly; tepals obtuse, 0.8–1.1 cm long, with spreading white hairs on the outside, lower lateral tepals narrow-lanceolate, usually 2–2.5 mm broad, upper lateral tepals 3–3.5 mm broad, upper lamina of median tepal 3–5 mm long, spur upright slightly recurved 2–2.5 cm long, to 4 mm wide, proximally; lamina of nectary 1–1.1 cm long, trilobate, the middle lobe narrower, 3 mm long, ca. 5 mm broad, obtuse, slightly emarginate, the lateral lobes broad, semi-orbicular; follicle slightly compressed laterally, erect, with a stalk 4–5 mm long, usually one-third as long as the follicle, the latter not sharply rugose, and densely covered with spreading white hairs, passing into a beak 3.5–4 mm long; ripe ovary 0.7–1(1.2) cm long, 2.75 mm broad. May–June. (Plate VIII, Figure 3).

Dry stony foothill slopes in the semidesert zone. — Centr. Asia: Pam.-Al. (E.), Mtn. Turkm. **Gen. distr.:** Iran. Described from Baluchistan. Type in Geneva.

13. *D. rugulosum* Boiss. in *Ann. Sc. nat.* XVI (1841) 361; *Fl. Or.* I, 76; Busch in *Fl. Cauc. crit.* III, 3, 41. — *Consolida rugulosa* Schrodinger in *Ann. Nat. Hofmus.* XXVII (1913) 43; Grossg., *Fl. Kavk.* II, 101. — Exs.: H. F. A. M. No. 131; Sintenis, *It. transcasp.-pers.* 1900–1901, No. 143.

113 Annual; stem 10–25(35) cm high, simple, rarely slightly branched at base, with horizontally spreading slender white hairs and less numerous yellowish hairs basally broadened utricularly; leaves short-petioled, dissected into 3 lobes, the middle lobe apically cleft into 3 linear lobules ca. 2 mm broad, the lateral lobes similarly cleft or else dissected into 2-segmented lobules; bracts similar to lower leaves but less dissected, much longer than flowers; bracteoles minute, entire, close to flowers; pedicels densely covered with spreading hairs, 3.5 mm (in fruit 2–3 mm) long [sic]; flowers pale pink, solitary, in axils of bracts almost from base of stem; tepals obtuse, 1–1.2 cm long, with long white hairs on the outside, lower lateral tepals narrow-lanceolate, to 3.5 mm broad, the upper to 3.5–5 mm broad, the upper median tepal similar to lower spur suberect or obliquely ascending, slightly curved 1.8–2 cm long and ca. 2.5–3 mm wide proximally; lamina of nectary ca. 1 cm long, trilobate, the middle lobe

narrow, ca. 2 mm long, emarginate, the lateral lobes large, semiorbicular; follicle terete, erect, prominently rugose, densely covered with white spreading hairs, prolonged on one side into a beak 3–3.5 mm long, the ovary (1.2)1.5–1.8(2) cm long, 3–4.25 mm thick. Seeds with very conspicuous squamules. April–May. (Plate VIII, Figure 4).

Dry semidesert foothill slopes, depressions between hummocks in sandy deserts and old sod fields. — Caucasus: S. Transc.; Centr. Asia: Ar.-Casp., Balkh., Dzu.-Tarb., T. Sh., Syr-D., Kyz. K., Kara K., Pam.-Al., Mtn. Turkm. **Gen. distr.:** Iran, Arm.-Kurd. Described from the shores of Lake Urmia. Type in Geneva; cotype in Leningrad.

14. **D. paradoxum** Bge. in Arbeit. d. naturforsch. Verein. z. Riga I (1848) 124; Boiss., Fl. Or. I, 75. — *Consolida paradoxa* Nevski comb. nova.

Annual; stem 7.5–16 cm high, simple, very rarely slightly branched at base, with spreading white and shorter, basally inflated, yellow hairs; leaves short-petioled, dissected into 3 lobes, the middle lobe apically cleft into 3 and the lateral into 2 linear lobules. Bracts similar to lower leaves but sessile, their lobes often entire; bracteoles small, entire, close to flowers; pedicels very short, ca. 3 mm long in fruit, densely covered with spreading hairs; flowers pale pink, without spur and nectary, hidden in axils of bracts; tepals obtuse, 0.8–1 cm long to 3 mm broad, narrow-lanceolate, with long white hairs on the outside; follicle short-terete, erect, prominently rugose, densely covered with spreading white hairs, unilaterally prolonged into a beak 3 mm long, mature follicle as broad as and almost as long as *D. rugulosum*. April–May.

Saxaul forests and sandy deserts. — Centr. Asia: Kyz. K., Kara K. **Gen. distr.:** Iran. Described from the Yany-Darya River valley. Type in Paris; cotype in Leningrad.

Note. Apparently a mutation of *D. rugulosum* Boiss.

Subgenus 2. EUDELPHINIUM Huth in A. Engler Bot. Jahrbucher XX (1895) 365. — Characters in key (p. 79).

- 114

+

1.

Color of nectaries and staminodes black-brown, quite different from bluish or violet color of the tepals, considerably shorter than tepals; tepals rarely also dark-colored-brown with a slight purple tinge (Section 1. *Elatopsis* Huth) 2.
- +

Color of nectaries and staminodes blue, lilac, yellow, dark purple, etc., but not black-brown, only rarely different from color of the tepals; staminodes often not shorter than tepals (Section 2. *Kolobopetala* Huth, and section 3. *Diedropetala* Huth) 38.
2.

Tepals brown, with a slight purple tinge 36. *D. triste* Fisch.
- +

Tepals of blue and violet hues 3.
3.

Base of blade at least in some leaves, cuneate, more or less abruptly tapering into the petiole 4.
- +

Base of leaf blade cordate or truncate, not cuneately tapering into the petiole, rarely slightly attenuate 12.
4.

Upper part of stem, entire axis of inflorescence, pedicels, and sometimes leaves glandular-pubescent 5.

- + Plants with a more or less developed indumentum of simple appressed or spreading, sometimes setose hairs, without glandular hairs 6.
5. Terminal teeth of leaf lobes rounded-ovate, tapering into a more or less sharply expressed pricklelike mucro. Spur conically saccate, 7–10 mm long, 5–6 mm wide proximally. . . 15. *D. brunonianum* Royle.
- + Terminal teeth of leaf lobe obtuse, without a mucro. Spur stoutly terete 16. *D. propinquum* Nevski.
6. Flowers large, tepals (1.7)2–3 cm long, widely gaping 7.
- + Flowers smaller, with tepals 1–1.5 cm long, not widely gaping 9.
7. Inflorescence a very sparse few-flowered raceme (2–7 flowers). Bracteoles linear-lanceolate or broad-linear, 1.2–1.5 cm long, ca. 2(2.25) cm broad, near flower or very slightly lower and, usually protruding above the horizontal spur 25. *D. dasyanthum* Kar. et Kir.
- + Inflorescence a many-flowered raceme or rarely, in impoverished plants, of 4–7 flowers. Bracteoles slightly distant from flower, not protruding above the horizontal spur, narrow-linear, 0.5–1 cm long, ca. 0.75(1) mm broad or ovate and lanceolate, 0.7–1 cm long, 3–4.5(5) mm broad 8.
8. Bracteoles ovate or ovate-lanceolate or lanceolate, 0.7–1 cm long, 3–4.5(5) mm broad. Tepals 2–3 cm long . . . 26. *D. poltoratzkii* Rupr.
- + Bracteoles narrow-linear, 0.5–1 cm long, ca. 0.75(1) mm broad. Tepals 1.75–2 cm long 27. *D. oreophilum* Huth.
- 115 9. Flowers violet 28. *D. confusum* M. Pop.
- + Flowers blue 10.
10. Tepals densely covered on the outside with long, right-angled, spreading white hairs. Bracteoles linear-subulate or linear-filiform, ca. 0.75 mm broad 44. *D. villosum* Stev.
- + Tepals densely covered on the outside with short appressed hairs or else glabrous. Bracteoles ovate or ovate-lanceolate or lanceolate, rarely linear, to 2.5–5 mm broad. 11.
11. Lower part or entire stem densely covered with rigid recurved hairs 2–3 mm long 43. *D. retropilosum* (Huth) Sambuk.
- + Lower half of stem glabrate or with few spreading hairs below inflorescence as well as inflorescence axis, short-appressed-pubescent, rarely glabrous 42. *D. cuneatum* Stev.
12. Bracteoles elliptic, broad-ovate, ovate, or ovate-lanceolate 13.
- + Bracteoles linear, linear-filiform, linear-subulate, or linear-lanceolate, rarely oblong-lanceolate or lanceolate 20.
13. Bracteoles elliptic or broad-elliptic, close to base of pedicels 49. *D. maackianum* Rgl.
- + Bracteoles more or less close to flower 14.
14. Tepals quite glabrous on the outside, with ciliate margins, sometimes with few ciliate hairs on the inside 15.
- + Tepals more or less strongly pilose on the outside 17.
15. Flowers widely gaping, few, always disposed in a simple raceme, tepals 2.2–3.3 cm long, pedicels erect . . . 22. *D. megalanthum* Nevski.
- + Flowers not very widely gaping, numerous, disposed in a dense often basally branched raceme; tepals 1.5–2 cm long; pedicels more or less spreading 16.

16. Bracteole with long white cilia along margins 29. *D. bracteosum* Somm. et Lev.
 + Bracteoles quite glabrous 30. *D. ruprechtii* Nevski.
17. Outer surface of tepals and spur with rather sparse characteristic
 116 short, right-angled spreading hairs, some of these utricularly
 broadened at base, or with small terminal glands; long flexuous
 simple hairs also present 31. *D. arcuatum* N. Busch.
 + Outer surface of tepals and spur more or less densely covered with
 simple, slender flexuous hairs 18.
18. Flowers large, widely gaping, tepals (1.6)2–3(3.3) cm long 19.
 + Flowers smaller, not widely gaping, tepals ca. 1.5 cm long
 32. *D. osseticum* N. Busch.
19. Leaves orbicular or suborbicular, margins of lateral lobes adverse
 to petiole, usually convergent and more or less overlapping. Tepals
 1.6–2.2 cm long 23. *D. sauricum* Schischk.
 + Leaves rounded-reniform or rounded-cordate, margins of lateral
 lobes not convergent and not overlapping. Tepals 2.5–3(3.3) cm long
 21. *D. speciosum* M. B.
20. Plants with well developed glandular pubescence and a sharp
 repulsive odor 28. *D. foetidum* Lomak.
 + Plants without an unpleasant odor, usually with glandular pubescence,
 rarely confined mainly to the inflorescence 21.
21. Small high-mountain plants, (7)10–40 cm high, with a few ((1)2–7(10))
 large flowers with (1.5)2–2.6 cm long tepals 22.
 + Plants taller, usually to 1 m or more high, inflorescence a many-
 flowered, simple or basally branched raceme, sometimes thyrsoid.
 Flowers often smaller 24.
22. Spur subsaccate, obtuse, slightly recurved 7–10(15) mm long, 5–8 mm
 wide proximally. Stem almost leafless, furcately branched above
 base, bearing 2 large flowers, rarely very profusely branched, 4-
 flowered, with a slight pubescence of simple hairs and some glandular
 hairs, or else glabrous 17. *D. lacostei* Danguy.
 + Spur terete, 14–20 mm long, 2.5–3.5 mm wide proximally, sub-
 horizontal, with a more or less recurved tip 23.
23. Stems stoutish, usually 3.5–6.5 mm thick at base, (7)10–25(4) cm
 high; pubescence (mainly in their upper half) of simple flexuous long
 white hairs. Leaves almost entirely radical. Tepals broad-ovate,
 1.9–2.6 cm long, 1–1.5 cm broad, densely villous on the outside and
 with similar long but sparse hairs on the inside
 19. *D. caucasicum* C. A. M.
- 117 + Stems slender, 2.5–3 mm thick at base, 20–40 cm high, leafy to half
 their height, more or less densely covered with short reclinate simple
 hairs; in addition to long white simple hairs, inflorescence axis
 densely covered with short yellowish, basally utricularly broadened
 hairs. Tepals ovate or oblong-ovate, (1.5)2–2.5 cm long, (5.5)8–
 10 mm broad, long-pilose on the outside, glabrous on the inside.
 24. *D. mirabile* Serg.
24. Leaves dissected almost to base into rhombic-lanceolate or narrow-
 lanceolate more or less dissected lobes. (Dissection between lobes
 terminates 2–5(7) mm from base of blade). 25.

- + Leaves usually dissected to much below the middle, but to far short of the base, into rhombic or lanceolate-rhombic more or less incised, rarely dissected lobes. (Dissection between lobes usually terminates not less than 10–15 mm from base of blade) 27.
25. Outer surface of tepals and spur densely covered with short appressed more or less crisp hairs; stem and both sides of leaves densely, often tomentosely covered with similar hairs 35. *D. crispulum* Rupr.
- + Tepals and spur quite glabrous on the outside, becoming ciliate along the margins and pilose on the inside. Leaves glabrous or slightly pubescent only along the veins 26.
26. Tepals 12–15 mm long, ca. 7–8 mm broad 36. *D. buschianum* Grossh.
- + Tepals 20–25 mm long, to 12 mm broad 37. *D. mariae* N. Busch.
27. Leaves concentrated at base of stem or in its lower part, with more or less strongly developed indumentum of setose appressed hairs on both sides, usually scabrous 28.
- + Leaves evenly spaced on stem 31.
28. Follicles quite glabrous 29.
- + Follicles densely pilose or covered with sparse long hairs 30.
29. Leaves disposed in lower part of stem, rounded-cordate. Stems 55–125 cm high. Raceme simple or proximally branched 45. *D. korshinskyanum* Nevski.
- + Almost all leaves radical, orbicular or rounded-reniform or rarely rounded-cordate. Stems 30–75 cm high. Raceme simple 46. *D. crassifolium* Schrad.
30. Raceme simple, narrow. Follicles with long sparse hairs 47. *D. iliense* Hugh.
- 118 + Inflorescence thyrsoid, many-flowered, rarely depleted with 5–6 flowers, almost umbelliform. Follicles densely pilose 48. *D. corymbosum* Rgl.
31. Bracteoles 5–15(20) mm from base of flower, narrow-linear. Flowers pale azure or pale blue, pedicels 2–8 cm long, slender, very strongly arcuately squarrose 34. *D. pyramidatum* Albov.
- + Bracteoles very close to flower. Pedicels usually shorter, 1–3 cm or more long, erect. Flowers dark blue or blue-azure, rarely pale blue 32.
32. Outer surface of tepals quite glabrous, more or less ciliate only at the margin, rarely (mainly near their apex and on the spur) bearing few short yellowish hairs, utriculately broadened at their base 33.
- + Outer surfaced tepals densely pubescent with long slender flexuous white hairs 34.
33. Outer surface of tepals quite glabrous, sometimes long-ciliate along margins, 1.5–1.75(2) cm long. Leaf petioles, bracts, and bracteoles more or less ciliate. Lateral surface of seeds membranously plicate-rugose 23. *D. flexuosum* M. B.
- + Tepals 1.1–1.3(1.5) cm long, quite glabrous, more or less short-ciliate only above at the margin, or else with few short yellowish hairs utriculately broadened in their lower part on the outside (mainly at apex and on spur). Leaf petioles glabrous or with sparse white

- setose hairs. Bracteoles and bracts quite glabrous or else with yellowish broadened hairs, such as sometimes present on the tepals. Lateral surface of seeds smooth 41. *D. elatum* L.
34. Flowers large, widely gaping, tepals 2–2.7 cm long 20. *D. dasycarpum* Stev.
+ Flowers small or of medium size, not widely gaping, tepals 0.8–2 cm long 35.
35. Plants more or less pubescent, with only simple slender hairs . . . 36.
+ Pubescence of more or less abundant simple slender hairs, with a greater or lesser admixture of glandular or basally utricularly broadened hairs 37.
36. Tepals 1.2–1.5 cm long, 0.4–0.65 cm broad, glabrate, with few setose hairs on the outside, near the apex 40. *D. cryophilum* Nevski.
+ Tepals 1.5–1.75(2) cm long, 0.8–1.3 cm broad, more or less strongly pubescent on the outside . . . 33a. *D. flexuosum* var. *dasyanthum* Rupr.
37. Stem very densely leafy. Pubescence with a considerable admixture of glandular hairs 38. *D. inconspicuum* Serg.
+ Stem not densely leafy. Pubescence almost entirely composed of simple slender hairs; utricularly broadened and yellowish hairs extremely rare 39. *D. ochotense* Nevski.
38. Tepals pale or bright yellow, nectaries and staminodes of the same color, rarely azure 39.
+ Tepals of a different color (azure, blue, lilac, blackish-purple, etc. 42.
39. Follicles with 3 very prominent longitudinal ribs and obscure transverse veins, glabrous. Pedicels glabrous up to bracteoles, with a unilateral longitudinal barble of yellowish hairs above the bracteoles 81. *D. semibarbatum* Bienert.
+ Follicles without prominent ribs, reticulate-nerved, glabrous or pilose. Pedicels glabrous or pubescent throughout their length . . . 40.
40. Nectaries and staminodes blue. Lower bracts 1–2-ternately dissected into narrow-linear lobes 78. *D. szovitsianum* Boiss.
+ Nectaries and staminodes yellow, rarely light azure near apex. Bracts usually all entire 41.
41. Tepals oblong-obovate, 10–11(13) mm long, 3.5–4.5(5.5) mm broad, usually glabrous, rarely spreading-pilose on the outside. Spur 1.3–1.6 cm long, obliquely ascending or subhorizontal 79. *D. ochroleucum* Stev.
+ Tepals obovate, 10–12 mm long, 5.5–8 mm broad, short-appressed-pubescent on the outside. Spur 1.5–1.8 cm long, obliquely reflexed or subhorizontal 80. *D. biternatum* Huth.
42. Cauline leaves broad-lanceolate, cuneately tapering to base, apically cleft almost to the middle into 3 linear bidentate lobes 65. *D. batalinii* Huth.
+ Leaves rounded-cordate or rounded-reniform but not lanceolate-cuneate in outline, dissected or cleft differently from the above . . . 43.
43. Tepals quite glabrous on both sides 44.
+ Tepals on the outside especially dorsally [sic.] sometimes proximally more or less densely covered with simple, rarely glandular appressed or spreading hairs 51.
44. Follicles densely pilose throughout 45.

- + Ovaries and follicles quite glabrous, rarely (in *D. dictyocarpum*) more or less ciliate along the sutures 46.
45. Flowers bright azure. Leaves ca. 2-3.5 cm long. Stem 60-75 cm 62. *D. lipskyi* Korsh.
- + Flowers bright blue. Leaves ca. 5-6.5 cm long. Stem 75-100 cm high 61. *D. ternatum* Huth.
46. Stem profusely and diffusely branched in upper half. Pedicels spreading or arcuately ascending, 3-6 cm long 63. *D. longipedunculatum* Rgl. et Schmalh.
- + Stem simple or slightly branched above, raceme simple or slightly branched basally. Pedicels declinate, 0.5-2.5 cm long 47.
47. Spur unilaterally inflated distally, with a very prominent gibbosity. Leaves concentrated in lower part of stem, suborbicular, dissected into 3 lobes, the middle lobe obovate, cuneately tapering to base, shallowly cleft apically at the apex into 3-5 entire obtuse lobules; lateral lobes dissected to the middle into 2 broad-cuneate lobes of the second order, shallowly cleft apically into oblong obtusely 2-3-toothed lobules 64. *D. semiclavatum* Nevski.
- + Spur rather obtusely pointed, without a conspicuous gibbosity at its tip. Leaves spaced more or less evenly along stem, variously dissected into lobes with very narrow sections 48.
48. Petioles of cauline leaves not broadened, or scarcely broadened at base 52. *D. dictyocarpum* DC.
- + Petioles of cauline leaves very strongly broadened and inflated at base, forming a kind of abbreviated sheath half-embracing the stem 49.
49. Flowers lilac-colored. Spur 15-17 mm long 74. *D. leiocarpum* Huth.
- + Flowers violet-blue. Spur ca. 12 mm long 75. *D. albomarginatum* Simonova.
- ++ Flowers pale, whitish or grayish lilac-azure. Spur 10-11 mm long 50.
50. Stem short-pubescent below, glabrous above. Leaves with slightly pubescent lobes 67. *D. bucharicum* M. Pop.
- 121 + Stem densely glandular pubescent with golden-yellowish hairs, from base up to inflorescence. Leaf lobes densely pilose 68. *D. inopinatum* Nevski.
51. Flowers 2-4, very large, tepals 1.9-2.1 cm long, spur of upper tepal 2.2-2.5 cm long, pale violet 60. *D. knorringianum* B. Fedtsch.
- + Flowers more numerous, in a dense or loose raceme, usually smaller, tepals not longer than 1.5 cm or if larger, blue or azure 52.
52. Petioles much broadened and more or less inflated proximally, forming a kind of abbreviated sheath, half-embracing the stem 53.
- + Petioles not broadened or scarcely broadened, not inflated at base 60.
53. Outer surface of tepals glandular-pubescent, mainly at base 69. *D. turkmenum* Lipsky.
- + Outer surface of tepals more or less pubescent with only simple appressed hairs 54.
54. Raceme dense or very dense, with only the lower flowers slightly removed, or else raceme rather loose but then very long, to 70 cm and many-flowered 55.

- + Raceme loose, with few, distant flowers 59.
55. Flowers pale, whitish or grayish lilac-azure. Raceme rather loose, very long and many-flowered 66. *D. karategini* Korsh.
- + Flowers azure or lilac or blackish-purple. Raceme dense 56.
56. Flowers blackish-purple 62. *D. puniceum* Pall.
- + Flowers azure or lilac 57.
57. Flowers lilac. Tepals obovate and very obtuse 73. *D. pallasii* Nevski.
- + Flowers azure. Tepals ovate, slightly attenuate at apex and rather obtusely acuminate 58.
58. Lower bracts entire, rarely dissected into few lobules but then only slightly surpassing the pedicels. Flowers bright azure blue 76. *D. schmalhauseni* Albov.
- + Lower bracts similar to leaves but smaller, deeply and repeatedly parted into narrow-linear lobules, considerably overtop flowers, imparting a curved shape to the inflorescence in its lower part. Flowers slightly darker, blue 77. *D. freynii* Conrath.
59. Flowers dark violet 70. *D. laxiusculum* (Boiss.) Rouy.
- 122 + Flowers pale; tepals with azurish violet veins on a whitish background 71. *D. quercetorum* Boiss. et Hausskn.
60. Outer surface of tepals and spur with few right-angled spreading, mostly glandular hairs. Pedicels with dense, more or less glandular pubescence; some of the yellowish hairs utricularly inflated 61.
- + Outer surface of tepals and spur more or less pubescent with appressed simple hairs. Pedicels glabrous, or with simple hairs 62.
61. Leaf blade quite glabrous. Raceme basally branched 55. *D. aemulans* Nevski.
- + Leaf blade short-pubescent beneath along the veins. Raceme simple 56. *D. altaicum* Nevski.
62. Limb of staminodes (6)8–10 mm long, (5)6–8 mm broad, orbicular-ovate, entire, the upper margin more or less crenate, rarely shallowly incised 63.
- + Limb of staminodes 4–6(7) mm long, 3–4(5) mm broad, oblong-ovate, deeply incised 65.
63. Stem more or less branched above. Terminal leaf lobules narrow-linear, ca. 1–2 mm broad, very long 59. *D. grandiflorum* L.
- + Stem simple, inflorescence a simple raceme. Terminal leaf lobules linear-lanceolate or broad-linear, (2.5)3–4 mm broad, shorter 64.
64. Stem (mainly in upper part), axis of inflorescence, pedicels, and leaf petioles densely appressed-pubescent. Tepals lanceolate, acuminate or rather obtusely acuminate 58. *D. brachycentrum* Ldb.
- + Stem axis of inflorescence and leaf petioles quite glabrous or glabrate. Pedicels more or less pubescent only above the bracteoles. Tepals ovate or ovate-lanceolate or elliptic, obtuse 57. *D. cheilanthum* Fisch.
65. Spurs 1.5–2 cm long, 3 mm thick proximally. Flowers in loose, few-flowered racemes 51. *D. laxiflorum* DC.
- + Spurs 1.1–1.3 cm long, 2–3 mm wide proximally. Raceme many-flowered, usually branched at base 66.

66. Entire plant covered with a gray velutinous tomentum 53. *D. uralense* Nevski.
 + Only pedicels, bracteoles, and the outer surface of floral parts
 densely appressed-pubescent. Leaves, stem, and petioles glabrous or
 glabrate 54. *D. cyananthum* Nevski.

123 Section 1. **ELATOPSIS** Huth in Engler. Bot. Jahrbuch. XX (1895) 339,
 391.— Nectaries and staminodes black-brown, sharply differing in color from
 the bluish or violet, rarely brownish, tepals and much longer than the latter;
 limb of staminoides deeply incised, with margin more or less white-ciliate,
 on the upper side, about the middle, with a tuft of yellow or yellowish hairs
 at base of incision.

Series 1. **Moschata** Nevski.— Plants with glandular pubescence;
 leaves reniform, strongly cuneately tapering into petiole; flowers very
 large, spur one-third to two-thirds as long as the tepals. Follicles 3–5(7).

15. *D. brunonianum* Royle, Illustr. (1839) 56; Hook. fl., Fl. Brit. Ind.
 I (1875) 27; Huth, Monogr., 392.— Ic.: Bot. Mag., tab. 5461.— Exs.:
 H. F. A. M. No. 129.

Perennial with a musky odor; stem 35–50 cm high, to 6 mm thick,
 glabrous below, upper half, axis of inflorescence and pedicels with a very
 dense, short, glandular pubescence, petioles more or less pilose, broadened
 at base; leaves 5–6.5 cm broad, semiinfundibular at base, abruptly
 attenuated into petiole, dissected to middle or slightly below into 3 laterally
 overlapping lobes; the middle lobe narrower, broad-obovate, shallowly
 cleft at apex into 3–5 lobules terminating in 3 or 2 orbicular-ovate teeth
 that taper to a more or less conspicuous pricklelike mucro; lateral lobes
 of blade dissected to the middle into 2(3) laterally overlapping lobes of
 the second order, resembling in shape and type of cleavage the middle lobe
 of the first order; upper leaves less dissected, with lobes cleft into entire,
 large rounded-ovate lobules, more or less glandular-pilose above and
 beneath; bracts glandular-pubescent, the lower lobate and the upper entire,
 linear acuminate, ca. 1–2 cm long; bracteoles opposite, at base of flower,
 linear-lanceolate, obtusely acuminate, ca. 9–10(15) mm long, densely
 glandular-pubescent and, in addition, with simple white hairs; pedicels
 arcuately ascending, 2–5 cm long; raceme loose, with 5–10 blue or light
 blue flowers; tepals with slender white hairs on both sides (more profuse
 on the outside), obovate, 2.3–2.8 cm long, 1.5–1.8 cm broad, finely
 membranous, obtuse margins white-ciliate; spur very short, 7–10 mm long
 and 5–6 mm wide, conical-saccate obtuse, recurved; nectaries with bilobate,
 slightly ciliate apex; staminodes including claw, ca. 1.5 cm long.
 Follicles usually 5, densely pilose, ripe ovary 1.2–1.3 cm long. August–
 September. (Plate IX, Figure 1).

124 Stony mountain slopes.— Centr. Asia Pam.-Al. (Pamir, Shugnan).
 Gen. distr.: Ind.-Him., Tibet (W.). Described from Kumaun. Type in
 London.

Note. This plant is often confused with *D. cashemirianum* Royle,
 which does not occur in the USSR, but can easily be distinguished from it

by its reniform, and proximally semi-infundibular, but neither cordate nor flat leaves, as well as by the type of pubescence.

16. *D. propinquum* Nevski, sp. nova in Addenda VI, p. 551.

Perennial; stem 15–40 cm high, glabrate below, with sparse inconspicuous short hairs, in upper part with a denser glandular pubescence; petioles long, broadened at base, pilose; leaf blade flat or almost flat, with short, rather sparse, simple hairs above and beneath, dissected almost to base into 3 lobes, the middle lobe obcordate, cuneately tapering to base, apically cleft to one-third its length into 3 lobules terminating in (2)3–5 dissimilar, ovate-lanceolate or broad-lanceolate, obtusely acuminate teeth without mucros, the lateral lobes broad, dissected to the middle into 2 lobes of the second order: the upper resembles the middle lobe of the first order and usually slightly overlaps it. Inflorescence a loose, few-flowered raceme; pedicels 2–4.5 cm long, with very dense, short, glandular pubescence as well as long, simple hairs; bracteoles close to flower, pilose, linear-lanceolate, rather obtusely acuminate, 7–15 mm long, 2–3 mm broad; flowers large, blue with a slight violet tinge; tepals 2–3.1 cm long, 1.3–1.8 cm broad, broad-obovate, obtuse, membranous, glabrous on the inside, outer surface with long, rather numerous tangled white hairs; spur stoutly terete subhorizontal with a recurved, rather obtusely acuminate tip; lamina of nectaries apically glabrous. Follicles 3, pilose. August.

Alpine stony grass plots. — Centr. Asia: Pam.-Al. (Karategin). Endemic. Described from the edge of the Dibarar glacier. Type in Leningrad.

Series 2. *Glacialia* Nevski. — Small glandular-pubescent or glabrate high-mountain plants; leaves cordate; flowers very large, few (2(4)), spur ca. one-third to half as long as the tepals. Follicles (4)5.

17. *D. lacostei* Danguy in Journ. de Bot. Ser. 2, I, 3 (1908) 50. — *D. brunonianum* auct., fl. Turkest. pro parte.

125 Perennial small plant 10–20 cm high; stem slender especially in upper part with a pubescence of spreading, not very numerous white hairs, slightly glandular, or else the stem glabrous or glabrate, almost leafless, furcately branched above the base, and bearing 2, rarely 4, large flowers; leaves concentrated at base of stem, rounded-cordate or reniform-cordate, 3–4 cm broad, glabrous above, sparsely hairy beneath, on long, pubescent or glabrous petioles; leaf blade dissected to the middle or slightly below into 3 obovate or broad-obovate lobes, the middle lobe slightly longer than the others, all lobes shallowly cleft at the apex into 3 lobules with (1)2 or 3 obtuse teeth, the terminal denticles short, rounded-subtruncate, abruptly tapering into an extremely short subobtuse mucro; bracts entire or trilobate, bracteoles borne near middle of long pilose pedicels linear, ca. 8–10 mm long, more or less acuminate and pubescent; flowers blue, tepals finely membranous, pilose on the outside and with white but sparser hairs on the inside, the lateral tepals also bear long white cilia, the tepals along the margin rounded-obovate, to 2.5 cm long, 1.8–2 cm broad; upper tepal suborbicular, to 2 cm broad; spur broad, subsaccate obtuse slightly

recurved 0.7–1(1.5) cm long, 0.5–0.8 cm broad; nectaries and staminodes ca. half as long as the tepals, the nectaries long-ciliate at apex. Follicles densely pilose. August. (Plate IX, Figure 2).

Stony slopes in the upper reaches of mountain rivers.— Centr. Asia: Pam.-Al. (Pamir). Gen. distr.: Dzu.-Kash. Described from W. slopes of Mt. Sassar-la. Type in Paris.

Note. Closest to *D. glaciale* Hook. f. et Thoms., which is distinguished by its strong glandular pubescence and glabrate follicles.

Series 3. *Feotida* Nevski.— Small high-mountain plants with dense glandular or simple pubescence. Leaf cordate, not cuneate, blade dissected to base or almost to base into 3 lobes. Flowers very large, few, in a loose raceme, terete spur one-half to two-thirds as long as, or as long as the tepals. Bracteoles linear or linear-lanceolate. Follicles 3–5.

18. *D. foetidum* Lomak. in Acta Horti Tiflis. II (1897) 285.— *D. brunonianum* N. Busch in Fl. cauc. crit. III, 3(1903) 60, non Royle.— Exs.: Herb. Fl. Cauc. No. 65.

126 Perennial with an unpleasant odor; stem 15–40 cm high, ca. 6–7 mm thick at base, glandular pubescent throughout; petioles pilose, broadened at base; blades pubescent, rounded-reniform, dissected to base into 3 overlapping or scarcely overlapping lobes, the middle lobe subrhombic or obovate, cuneately tapering to base, cleft to one-third or slightly beyond into three 2–3-segmented lobules terminating in oblong-lanceolate obtuse teeth constricted into minute subobtuse mucros; the middle tooth usually considerably larger and longer than the lateral; lateral lobes of leaf blade rounded-rhombic or rounded-obovate, dissected to the middle into 2 lobes of the second order, dissection resembling that of the middle lobe of the first order; inflorescence loose, with few (1(2)5–18) violet-blue flowers; bracts linear, glandular-pilose, subobtuse, shorter than the long (3–5 cm long) densely glandular-pilose pedicels; bracteoles more or less close to flower, linear-lanceolate, subobtuse, pilose; tepals villous, with very long, tangled white hairs on the outside and similar, fewer hairs on the inside, broadly or suborbicularly obovate, with a slightly attenuate, obtuse apex, membranous, 2–2.5 cm long, 1.2–1.5 cm broad; spur slightly hamately recurved, stout-terete 1–1.2 cm long, 3–5 mm wide proximally, rather obtusely pointed; nectaries with a sparingly ciliate bilobate apex. Follicles 3–5, densely pilose. (July) August.

Stony slopes in the alpine zone at 3,250–3,500 m).— Caucasus: S. Transc. Endemic. Described from Karabakh. Type in Tbilisi; cotype in Leningrad.

Economic importance. A poisonous plant, used in oriental medicine as a cure for syphilis, dropsy, and epilepsy (Rollov, Dikorastushchie rasteniya Kavkaza [Wild Plants of the Caucasus] 162, sub *D. brunoniano* Royle). Because of its large flowers, this is an outstanding ornamental plant.

Note. V. I. Lipskii and N. A. Bush agreed that this species is distinguished from *D. brunonianum* Royle only by its odor. Yet it would be difficult to find another pair of high-mountain species in one genus that are so sharply differentiated morphologically mainly in the shape of the leaves, besides differences in flower color, type of pubescence,

and odor of the whole plant. The leaves of *D. brunonianum* are semi-infundibular proximally, tapering into petiole, reniform, shallowly dissected, with short terminal teeth constricted into a pricklelike mucro; in *D. foetidum* the leaves are flat, not tapering into petiole, rounded-reniform, deeply dissected, with long terminal subobtusate teeth. The two species certainly belong to different series of the genus.

- 127 19. *D. caucasicum* C.A.M., Verz. Pfl. Cauc. (1831) 200; Ldb., Fl. Ross. I, 63; Boiss., Fl. Or. I, 94; N. Busch in Fl. cauc. crit. III, 3, 60.—
D. speciosum α *caucasicum* Huth, Monogr. (1895) 416.—Exs.:
 HFR No. 103.

Perennial; rootstock slender, horizontal; stem (7)10–25(40) cm high, often flexuous, rather sparsely covered with long white hairs (more densely so in upper half); petioles broadened at base, pilose; leaves almost all radical, slightly pilose; blade rounded-cordate or suborbicular or rounded-reniform dissected almost to base into 3 lobes, the middle lobe rounded-rhombic or broad-obovate, cuneately tapering to base, usually dissected below to the middle into 3 cuneate-obovate lobules, these apically cleft to the middle, most often into 3 oblong-linear or lanceolate terminal teeth, the lateral lobules incised into teeth by 2 notches of unequal depth; lateral lobes of leaf blade transversely broadened, subflabellate, dissected to considerably below the middle into 2 lobes of the second order, dissection resembling the middle lobe of the first order; flowers few, in a loose inflorescence; pedicels long, usually 3–5 cm, densely covered with long slightly reclinate white hairs; bracteoles linear, rather obtusely acuminate, close to flower or very slightly distant, pilose; tepals broad-ovate, 1.9–2.5(2.6) cm long, 1–1.5 cm broad, violet-blue, rather densely villous with long white hairs on the outside, with similar but sparse hairs on the inside; spur terete, 1.5–1.9 cm long, 3–3.5 mm wide at base, with a more or less recurved apex; nectaries with a bidentate glabrous apex; follicles 3, pilose. July–September.

Glacial moraines in the alpine zone. — Caucasus: Greater Caucasus. Endemic. Described from Mt. Kazbek. Type in Leningrad.

Series 4. *Speciosa* Nevski. — Plants with a more or less developed pubescence of simple hairs, very rarely with an admixture of glandular hairs on pedicels and inflorescence axis. Base of leaf blade cordate, not tapering into petiole, the blade dissected into lobes to considerably below the middle. Flowers very large, widely gaping, always in a simple raceme, borne on upright, scarcely declinate pedicels; spur terete, slightly shorter than to two-thirds as long as the tepal. Bracteoles linear or ovate. Follicles 3.

20. *D. dasycarpum* Stev. ex DC., Syst. nat. I (1818) 547; M.B., Fl. taur.-cauc. III, 369.—*D. speciosum* β *dasycarpum* Rupr., Fl. Cauc. (1869) 36 et 287.

Perennial; stem 50–75(100) cm high, angled, covered with semiappressed short hairs; petioles slightly pilose, slightly broadened at base; leaf blade reminiscent of that of *D. speciosum*, usually orbicular-cordate, slightly

128 short-pubescent on both surfaces, paler-colored beneath, dissected to considerably below the middle into 3 lobes, dissection terminating ca. 8–10 mm from base; middle lobe rhombic, cleft into 3 lobules, the middle lobule ovate-lanceolate or lanceolate, each side having 1–2 bidentate lobules of the second order, as well as a single denticle, the lateral lobules of irregular shape with an unequally dentate margin; lateral lobes of leaf blade dissected into 2 lobes of the second order, the upper resembling the middle lobe of the first order. Raceme rather dense, axis of inflorescence and pedicels very densely covered with simple, slightly reclinate hairs of unequal length, very rarely with glandular hairs; bracts pilose, linear, or lower bracts lanceolate and incised; bracteoles narrow-linear, 7–10 mm long and 0.75 mm broad, densely pilose, close to flower; pedicels erect or slightly declinate, the lower to 7 cm long; flowers usually pale blue; tepals very densely covered on the outside, sometimes also on the inside, with long spreading, glossy white simple hairs, broad-ovate, subobtusate, 2–2.5 cm long, 9–13 mm broad. Spur 1.8–2 cm long; follicles to 1.8 cm long, with long dense spreading hairs, very rarely glabrous. July–August.

Subalpine meadows. — Caucasus: Cisc., W. Transc. Endemic. Described from the vicinity of Narzan. Type in Helsinki? Cotype in Geneva.

21. *D. speciosum* M.B., Fl. taur.-cauc. II (1808) 12; III (1819) 368; Ldb., Fl. Ross. I, 64. — *D. speciosum* α *typicum biebersteinii* Rupr., Fl. Cauc. (1869) 35. — *D. speciosum* β *gymnopus* Rupr., l.c. — *D. speciosum* γ *trichocarpum* Rupr., l.c. 36. — *D. ironorum* N. Busch in Bull. Acad. Sc. URSS (1931) 450, fig. 2. — *D. bracteosum* var. *macranthum* Som. et Lev. in A.H.P., XIII (1893) 25 et var. *albidum* Som. et Lev., l.c.? (non v.). — Ic.: M.B., Cent. pl. rar. Ross. I, (1810) tab. 5; Deless., Ic. select. I (1820) tab. 62.

Perennial; stem 35–75(100) cm high, slightly flexuous, more or less densely covered from the very base with abundant short and less abundant long, reclinate hairs; petioles slightly broadened at base, slightly pilose, those of lower leaves long; leaf blade rounded-cordate or rounded-reniform, slightly pubescent, mainly along the impressed veins, or glabrous above, pilose along the veins beneath, margins short-ciliate, dissected to considerably below the middle into 3 lobes, dissection terminating 6–17.5 mm from base; middle lobe rhombic or elongate-rhombic, dissected to about the middle into 3 lobes of the second order, the middle lobe ovate or ovate-lanceolate, with 2–4 lateral teeth, terminating in a large lanceolate tooth, the lateral secondary lobes unequally 2–4-toothed (sometimes the middle lobe less dissected, with but (1) 2–4 large broad-lanceolate rather obtusely acuminate teeth on each side and terminating in a large linear-lanceolate lobule); lateral lobes of the leaf blade broad, dissected to below the middle into 2(3) rhombic lobes of the second order, the upper resembling the middle lobe of the first order; raceme rather dense and long, to 45 cm long; pedicels stoutish, erect or slightly arcuately ascending, the lower to 6(9) cm long, the upper ca. 1.5(2.5) cm long, very densely covered with simple, slender reclinate hairs; lower bracts resembling upper leaves, upper bracts lanceolate, pilose; bracteoles more or less close to flower, densely pilose, ovate-lanceolate or ovate, 5–9(12) mm long, 2.75–4 mm broad; flowers widely gaping, light blue or blue, large; tepals broad-ovate, 2.5–3(3.3) cm long, 1–1.5 cm broad, rather obtusely acuminate, with long

slender simple white hairs inside and outside, as well as along the margins; spur usually horizontal, 1.5–1.9 cm long, slightly recurved; follicles to 1.8 cm long, glabrous or with pubescent long white hairs. July–August.

Subalpine meadows. — Caucasus: Cisc., Dag., E. Transc., W. Transc. Endemic. Described from the Kaishaur area. Type in Leningrad.

Note. In describing *D. ironorum*, recognized by us as a typical *D. speciosum*, N. A. Bush compared it with *D. arcuatum* Busch. There is no basis for this comparison, except the presence in the latter species, which is closely related to *D. flexuosum* M. B., of a characteristic pubescence of glandular, utriculately inflated and simple spreading hairs on the pedicels and tepals.

22. *D. megalanthum* Nevski sp. n. in Addenda p. 551. — *D. flexuosum* γ Paulovi Akinf. in Trav. Soc. Nat. l'Univ. Kharkow XXVII (1894) 167. — *D. speciosum* var. Paulovi N. Busch in Fl. cauc. crit. III, 3(1903) 64.

Perennial; stem 35–75 cm high, faceted, in lower half covered with rather sparse, spreading, slightly reclinate, simple slender hairs; upper part and axis of inflorescence glabrous; leaf petioles slightly broadened at base, with long ciliumlike hairs along margin; leaves as in *D. speciosum*, slightly pilose or glabrous above, lighter-colored beneath, pilose along the veins, margins short-ciliate; bracts and bracteoles as in *D. speciosum*, but glabrous, rarely with few cilia; bracteoles a more or less strong bluish-violet color. ovate-lanceolate or ovate, usually 7–9 mm long, 3–4 mm broad, rather obtusely acuminate; pedicels glabrous, rarely scarcely pubescent; flowers blue, tepals broad-ovate, 2.2–3.3 cm long, to 1.6 cm broad, quite glabrous on both sides, obtuse; spur 1.5–2.3 cm long, sub-horizontal and scarcely recurved near tip; follicles to 1.9 cm long (excluding beak), quite glabrous or else ciliate along sutures. July–August.

Subalpine meadows. — Caucasus: Cisc., E. Transc. (N.). Endemic. Described from the edge of the Bezenga glacier. Type in Leningrad.

Note. Distinguished from *D. speciosum* by the absence of pubescence on tepals, bracteoles, and upper part of stem.

Series 5. *Orbicularia* Nevski. — Plants with a rather strongly developed setose pubescence on stem; leaf blade not tapering into petiole, sub-orbicular, dissected into lobes to below the middle, the margins of lateral lobes convergent; flowers large, always in a simple raceme, borne on erect pedicels, widely gaping, spur about as long as the tepals; bracteoles ovate, follicles 3, always pilose.

23. *D. sauricum* Schischk. in Animadvers. syst. ex Herb. Univ. Tomsk. No. 8 (1936) p. 1.

Perennial; stems 30–80 cm high, very slightly ribbed, subterete, from base to inflorescence densely covered with white, reclinate setose hairs 1–1.5(2) mm long, or else glabrate; petioles bearing similar, though sometimes longer hairs, or else glabrate; leaves very similar in shape to those of *Aconitum rotundifolium* Kar. et Kir. but larger, with few appressed hairs or almost destitute of such hairs above, more or less spreading-pubescent along and between the veins beneath; leaf blade sub-orbicular or orbicular-reniform, dissected to below the middle into 3

laterally more or less overlapping lobes, the middle lobe orbicular-obovate or orbicular-rhombic, cuneate, cleft to slightly above the middle into 3 mostly obovate lobules, these in turn shallowly cleft at the apex into 3 or 2 ovate or elliptic obtuse or slightly attenuate terminal teeth, the middle tooth sometimes incised into 3 denticles; lateral lobes of the leaf blade cleft to the middle into 2 lobes of the second order which resembles the middle lobe of the first order in shape and in type of cleavage; inflorescence a not very dense raceme, flowers violet-blue, lowermost bracts with 3 linear lobes, middle and upper bracts entire, linear-lanceolate or lanceolate about as long as or shorter than the pedicels, pilose; pedicels scarcely declinate or appressed, covered with recurved or spreading, more or less crisp, long white hairs; bracteoles ovate, with a more or less attenuate and acuminate apex, densely pilose dorsally, with few ciliumlike hairs near apex and along the margins; bracteoles 6–8 mm long, 3.25–4.5 mm broad; tepals broad-ovate, 1.6–2.2 cm long, 0.8–1.2 cm broad, obtuse, rather sparsely pilose on the outside, the upper surface with long slender flexuous white hairs, sometimes concentrated near apex; spur subhorizontal, subterminally recurved, rather obtusely pointed (1.3) 1.5–2 cm long, 3–3.5 mm wide. July–August.

Subalpine meadows and around the timberline at 1,700–1,900 m. — Centr. Asia: Dzu.-Tarb. (Saur). Endemic. Described from the Uch-bulak River valley in the Saur Range. Type in Tomsk; cotype in Leningrad.

Note. Distinguished from *D. dasyanthum* Kar. et Kir. by its appressed pedicels, its pubescence, color of flowers, and shape of bracteoles.

Series 6. *Mirabilia* Nevski. — Plants with a pubescence of simple hairs in lower half, but inflorescence bearing utriculately broadened short yellowish hairs, with an admixture of simple hairs. Leaf blade not tapering into petiole, dissected almost to base into 3 lobes; flowers few, large, in a simple raceme, on declinate pedicels, the spur about as long as the tepals, bracteoles narrow-linear; follicles 3, pilose.

24. *D. mirabile* Serg. in *Animadv. Syst. Herb. Univ. Tomsk.* No. 4 (1930) 5; Kryl., *Fl. Zap. Sib.* V (1931) 1140. — *D. laxiflorum* β *alpinum* Bge., *Suppl. Altaic.* (1836) 44; Kryl., l.c., 1140. — *D. winklerianum* Huth in *Herb. Inst. Bot. Ac. Sc. URSS*, pro parte. — Ic.: Serg., l.c., tab. pag. 8 opp. fig. dextra.

Perennial; stems 19–38 cm high, slender, ca. 2.5–3 mm thick at base, leafy to slightly above, half their height, rather sparsely, sometimes very sparsely covered with soft short reclinate hairs, these replaced in the inflorescence to a greater or lesser degree by yellowish utriculately inflated hairs; petioles long, 2.5–3 times as long as the blade, pilose; leaf blade rounded-cordate or rounded-reniform, deeply cordate, 2.5–3.5(5) cm long, 3–5.5(9) cm broad, with soft semiappressed crisp hairs on both surfaces, but more pronounced beneath, dissected to considerably below the middle or almost to base into 3 lobes, the middle lobe rhombic, cleft to the middle into 3 lobules, the middle lobule usually tridentate, with a longer and larger elliptic-lanceolate central tooth, the lateral lobules bidentate, their lower teeth smaller; lateral lobes of the leaf blade dissected almost to base into 2–3 lobes of the second order, which resemble the middle lobe of the first order in their palmatisect appearance; raceme loose, with 3–7(10) dingy lilac-blue flowers; bracts linear-lanceolate, entire or the lower 2–3-lobuled, bracteoles

8–12 mm long, 0.6–0.75(1) mm broad, densely pilose, very close to flower; tepals oblong-ovate or ovate, obtuse, (1.5)2–2.5 cm long, (5.5)8–10 mm broad, glabrous on the inside, pilose on the outside; a spur subhorizontal, subterminally recurved, rather bluntly acuminate, 1.4–2 cm long, ca. 2.5 mm wide proximally; pedicels 1–2.5 cm long, declinate, densely pubescent. July–August.

High-mountain shortgrass meadows. — W. Siberia: Alt. Endemic. Described from the Taldura River valley in the Altai. Type in Tomsk.

Note. This species is undoubtedly closely related to *D. dasyanthum* Kar. et Kir., but not to *D. elatum* and *D. laxiflorum* as held by L. P. Sergievskaya. From *D. dasyanthum* it is distinguished by the denser pubescence of the small leaves and narrow bracteoles, by the shorter pedicels, and by the longer spurs. Its identity with *D. laxiflorum* β *alpinum* Bge. was proved by a study of authentic specimens of the latter, as well as by its diagnosis, in which the black-brown color of the staminodes and nectaries was mentioned.

Series 7. *Dasyantha* Nevskii. — Plants with a more or less developed pubescence of simple hairs; leaf blade, at least in some leaves, slightly cuneate, tapering into petiole, dissected into lobes to below the middle or almost to base; flowers large, blue or else blue with slight violet tinge, in a simple raceme, borne on more or less arcuately spreading pedicels; spur about two-thirds or slightly more than half as long as tepals; follicles 3, pilose.

25. *D. dasyanthum* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 138; E. Huth, Monogr., 396, pro parte.

Perennial; stem (15)20–35(40) cm high, to 5(9) mm thick proximally, with a very slight soft pubescence of short (0.5–0.75 mm long) slender, slightly reclinate obscure hairs; leaves borne at uneven intervals: petioles broadened at base, with slightly longer hairs; leaves 2.5–6(7) cm broad, slightly pilose beneath, glabrate above; leaf blade rounded-cordate or rounded-reniform, dissected almost to base into 3 lobes, not overlapping laterally the middle lobe rhombically broad-obovate, cuneately tapering to base, cleft to one-third its length usually into 3 lobules, the middle lobule short 3-segmented with 3(4) obtuse elliptic-lanceolate or orbicular-lanceolate terminal teeth, the lateral lobules incised into 2–4 dissimilar teeth; lateral lobes of the leaf blade dissected to about the middle into 2 lobes of the second order, the upper resembling the middle lobe of the first order; inflorescence a very loose, few-flowered raceme; flowers 2–7, 135 very remote; bracts large, the lower trilobate, the upper broad-linear or linear-lanceolate, subobtuse, slightly shorter than pedicels; pedicels 2.5–6 cm long, densely pilose, with more or less squarrose hairs of varying length; bracteoles pilose, linear-lanceolate or broad-linear, usually adjacent to flower and protruding above the horizontal spur; tepals ovate, rather strongly attenuate and obtusely acuminate, strongly pilose on the outside and along the margins, with sparse long white hairs on the inside; tepals 2–2.2 cm long, 0.8–1.1(1.5) cm broad; spur subhorizontal, terminally more or less recurved, rather obtusely pointed, 1.4–1.5 cm long, 3–4 mm wide. July. (Plate IX, Figure 3).

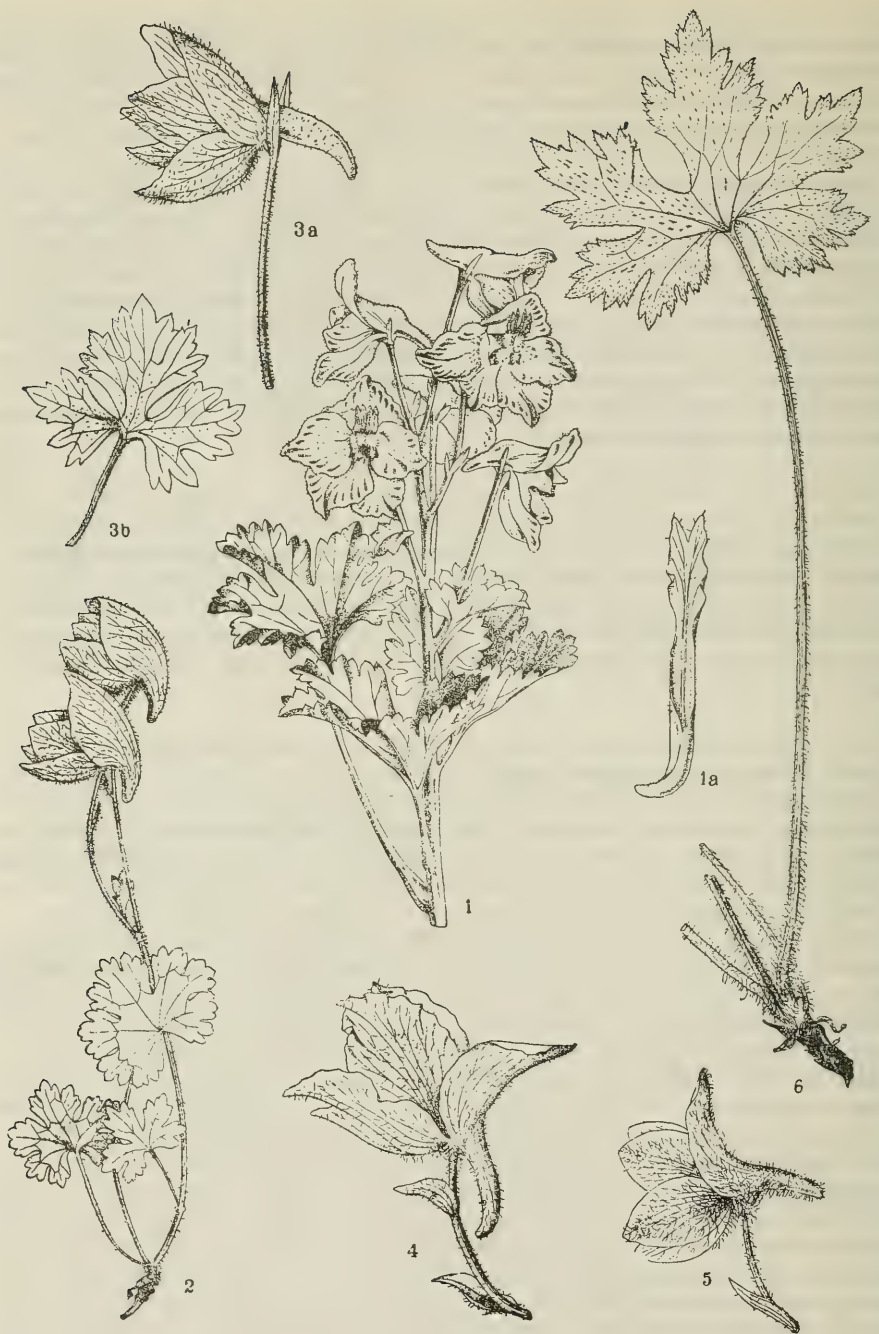


PLATE IX. 1 - *Delphinium brunonianum* Royle; 1a - nectary; 2 - *D. lacostei* Danguy; 3 - *D. dasyanthum* Kar. et Kir., a) flower, b) leaf; 4 - *D. poltoratzkii* Rupr.; 5 - *D. oreophilum* Huth.; 6 - *D. iliense* Huth.

Stony slopes in the upper reaches of rivers. — Centr. Asia: Dzu.-Tarb. Endemic in the Dzungarian Ala Tau. Described from rock streams along the upper course of the Sarkhan and Baskan rivers. Type in Leningrad.

26. *D. poltoratzkii* Rupr. in Osten-Sacken et Rupr. Sert. Tian-Schan., 37; in Mem. Ac. Petersb. 7 ser. XIV, 4(1869); Huth, Monogr. 397.

Perennial; stem 25–55 cm high, to 9 mm thick at base, throughout its length with a very slight, in upper part more highly developed, pubescence of obscure soft short declinate hairs; leaves at more or less regular intervals; petioles broadened at base, with long (1.5 mm) soft white hairs along margin; leaves slightly pilose, glabrate above, larger than in *D. dasyanthum*, 6–12 cm broad, rounded-reniform, rarely suborbicular-cordate, dissected to slightly below the middle into 3 laterally more or less overlapping lobes, the middle lobe obovate or rhombic-obovate, cleft to one-third or less into 3 lobules, the middle lobule 3–5(7–9)-toothed (teeth usually elliptic-lanceolate with a minute mucro); the lateral 3–5-toothed, the largest tooth being either the middle one or the lateral one adjacent to the middle lobule; lateral lobes dissected to the middle into 2 lobes of the second order, the upper very similar to the middle lobe of the first order; terminal teeth of upper leaves very small and numerous; inflorescence a loose raceme of 4–10 blue or lilac-blue flowers; bracts large, usually all entire, lanceolate or broad-lanceolate, slightly shorter than pedicels; pedicels 1.5–4 cm long, with a dense pubescence of spreading hairs of unequal length; bracteoles more or less colored, ovate-lanceolate or lanceolate or broad-lanceolate, pilose; tepals broad-ovate, slightly attenuate and bluntly acuminate, strongly pilose on the outside and along margins, with long sparse hairs on the inside; the lateral tepals 2–3 cm long, 1–1.5 cm broad; spur subterminal subhorizontal, more or less recurved, 9–15 mm long, ca. 3.5–4 mm wide. August. (Plate IX, Figure 4).

136 Subalpine zone. — Centr. Asia: T. Sh. Endemic. Described from the Shamsa Gorge. Type in Leningrad.

27. *D. oreophilum* Huth in Engler, Bot. Jahrbüch. XX (1895) 412. — *D. englerianum* Huth, l.c., 418, pro parte. — *D. speciosum* Huth, l.c., 415, pro parte, non M.B. — *D. dasyanthum*, Auct. fl. As. Med., pro parte, non Kar. et Kir.

Perennial; stems 30–60 cm high, terete, without prominent ribs, slightly pubescent with few spreading hairs; leaves mainly at base of stem, their petioles long, broadened at point of attachment, rather sparsely pubescent; leaf blade orbicular-reniform, glabrescent above, more strongly pubescent beneath (especially along the veins), sometimes densely pubescent on both surfaces, 2.5–6.5 cm long, 3.5–11 cm broad, dissected to below the middle into 3 laterally overlapping lobes, the middle lobe orbicular-obovate, or broad-obovate, cleft into 3(5) lobules between one-fourth and one-third its length, the latter terminating in 2(3) broad-lanceolate bluntly acuminate teeth, the middle tooth the largest of the 3 (terminal teeth about one-third as long as the lobule); lateral lobes very broad, dissected to the middle or slightly deeper into 2–3 lobes of the second order resembling the middle lobe of the first order; raceme large, not very dense, many-flowered; bracts of lower flowers more or less dentate, the upper linear or linear-lanceolate, shorter than pedicels; corolla very characteristic, usually long, 1.5–5(7) cm, very strongly spreading and arcuately ascending, more or less

densely covered with hairs of unequal length; bracteoles with dense long white hairs, narrow-linear; flowers lilac-blue; tepals ovate or broad-ovate, 1.7–2 cm long, 0.75–1.3 cm broad, bluntly acuminate, densely covered with tangled hairs on the outside, glabrate or slightly pilose on the inside, the spur subhorizontal obtusely pointed, almost straight or slightly recurved, 1.1–1.5 cm long, ca. 3 mm wide. July–August. (Plate IX, Figure 5).

Stony high-mountain shortgrass meadows above the juniper zone. — Centr. Asia: Pam.-Al., T. Sh. Endemic. Described from Darvaz. Type in Leningrad.

Series 8. **Confusa** Nevski. — Plants with a dense pubescence of simple hairs. Leaf blade cuneate, slightly tapering into petiole, dissected to below the middle. Flowers not large, violet, in a dense, usually simple raceme. Spur as long as or slightly longer than tepals. Bracteoles broad-ovate. Follicles 3, densely short-pilose.

28. *D. confusum* M., Pop. sp. nova in Addenda VI, p. 723. — *D. duhmbergii* Huth in Engler, Bot. Jahrbüch. XX (1895) 402, pro parte. — *D. speciosum* Huth, l.c., p. 415, pro parte, non M.B.

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Perennial; stem 30–65 cm high, densely pubescent from the base to the tip of inflorescence, with spreading, 1.5–2 cm-long hairs below, usually with a velutinous tomentum of very short hairs above; leaves concentrated in lower half of stem; petioles long, broadened at base, long-pilose; leaf blade orbicular-reniform, both surfaces densely covered with more or less spreading short hairs, velutinous or with a slight pubescence of appressed hairs above and more numerous long hairs beneath, where they are distributed mainly along the veins; the leaf blade dissected to below the middle into 3 lobes, the middle oblong-obovate or obovate, cleft for one-third into 3 lobules, the middle lobule 3–5-toothed, with the terminal teeth broad-lanceolate or triangular-lanceolate, rather obtusely acuminate, the middle tooth considerably larger; the lateral lobules each with 2–4 dissimilar teeth; lateral lobes of the leaf blade dissected to the middle or slightly deeper into 2 lobes of the second order, the upper resembling the middle lobe of the first order. Raceme dense, many-flowered, simple, rarely slightly branched proximally; bracts broad-lanceolate or lanceolate, entire (lowermost sometimes parted into 3 lobes), subobtusely, usually slightly shorter than pedicels, densely short-pilose; pedicels 0.5–1(1.5) cm long, slightly declinate, with a very dense short squarrose pubescence; bracteoles and bracts usually green or more or less violet when young, becoming semidissiccated and light grayish-brown during flowering, broad-ovate, obtuse or subobtusely, 5.5–7(9) mm long, 3–4(5) mm broad, very densely short-pubescent; flowers dark violet, not widely gaping; tepals ovate or obovate, obtuse, 1–1.5 cm long, 0.5–0.8 cm broad, densely short-pubescent on the outside, slightly pilose or glabrate on the inside, spur subhorizontal, subterminally recurved, rather obtusely pointed, pubescent, 1.2–1.5 cm long, (2)2.5–3 mm wide. July–August.

Mountain forests of *Picea schrenkiana*, subalpine stony grass plots. — Centr. Asia: T. Sh., Pam.-Al. Endemic. Described from the Akbashtau Mountains. Type in Leningrad.

Series 9. **Bracteosa** Nevski. — Tall plants with a more or less developed or obsolescent pubescence of simple hairs, rarely with an admixture of glandular inflated hairs on pedicels and tepals; leaves not cuneate and not tapering into petiole, dissected to considerably below the middle into elongate-rhombic lobes; flowers of medium size, violet-blue or dark blue, not very widely gaping, in a dense raceme, usually branched at base. Bracteoles mostly ovate or broad-ovate. Spur slightly shorter than tepals. Follicles 3, glabrous or slightly pilose when young.

29. **D. bracteosum** Somm. et Lev. in A.H.P. XIII (1893) 25; Busch in Fl. cauc. crit. III, 3 (1903) 67. — **D. flexuosum** β **bracteolatum** Akinf. in Trav. Soc. Nat. Univ. Kharkow XXVII (1894) 168?

Perennial; stems tall, to 1 m or more high, especially in upper part slightly canaliculate and glabrate or glabrous; petioles not broadened at base, with long ciliumlike hairs; leaves similar to those of *D. flexuosum*, orbicular-reniform or orbicular-cordate, dissected to considerably below the middle into 5–7 lanceolate-rhombic elongated acuminate lobes, these very strongly incised-dentate, with numerous triangular-lanceolate, slightly tortuous teeth or bidentate lobules, glabrous above, slightly pilose along the veins beneath; raceme very dense, to 7.5 cm broad, branched below, with glabrous axis; bracts elliptic or elliptic-lanceolate, whitish-greenish, long-ciliate-margined; pedicels usually glabrous, obliquely ascending; bracteoles elliptic, with broad white scarious or more or less bluish violet margins densely covered with long white cilia, the bracteoles obtuse, close to flower, 8–10 mm long, 4–5 mm broad; tepals broad-obovate or rounded-obovate, obtuse, 1.8–2 cm long, 1.2–1.5 cm broad, glabrous on both surfaces, margins sparsely white-ciliate; spur horizontal and almost straight or with a slightly recurved tip, 1.5–1.9 cm long; follicles glabrous (according to some sources glandular-pubescent); July–August.

Forest margins at the timberline and subalpine meadows. — Caucasus: E. Transc. (Ossetia), Dag. Endemic. Described from the vicinity of Tseya in Ossetia. Type in Florence.

Note. This species of Sommier and Levier, including the varieties established by them, is undoubtedly a collective species. Further verification is required to determine if our interpretation is consistent with the type collected by Loika in Ossetia. It may be that the plant which we have called *D. bracteosum* should be described as a separate species, and that *D. bracteosum* should be considered a synonym of *D. speciosum* M.B.

30. **D. ruprechtii** Nevski, sp. nova in Addenda VI, p. 552. — **D. flexuosum** var. **bracteolatum** N. Busch in Fl. cauc. crit. III, 3 (1903) 67, pro parte.

Perennial; stem tall, to 1 m high, ribbed, slightly pubescent or glabrate; leaf petioles broadened or scarcely broadened at base, pilose; leaf blade resembles that of *D. flexuosum*, but its lobes have fewer lateral teeth, the blade slightly and minutely pubescent above, with longer hairs along the veins beneath, dissected to considerably below the middle into 3 lobes (dissection terminating 5–10 mm from base); middle lobe elongate-rhombic, cleft into 3 lobules, the middle lobule large, ovate-lanceolate or broad-lanceolate, usually with only 2 pairs of lateral teeth and a large lanceolate

terminal tooth; the lateral lobules unequally 3-5-toothed; lateral lobes of the leaf blade cleft into 2 rhombic lobes of the second order which resemble the middle lobe of the first order; raceme dense, usually simple and with a glabrous axis; bracts lanceolate, margins more or less ciliate; pedicels glabrous, obliquely ascending or slightly arcuate; bracteoles elliptic or elliptic-ovate, violet-blue, quite glabrous, 5.5-8 mm long, 4-4.75 mm broad, subobtuse, more or less close to flower; tepals ovate or elliptic-lanceolate (lower lateral), 1.5-2 cm long, to 1.2 cm broad, obtuse, glabrous on the outside, ciliate-margined, usually with sparse cilia on the inside; spur 1.5(2) cm long. July-August.

Subalpine meadows. — Caucasus: Dag., S. Transc. Endemic. Described from the area between the mountain villages of Chirakh and Rycha (Dag.). Type in Leningrad.

Note. Distinguished from *D. flexuosum* by its bracteoles and the shape of its leaves, and from *D. bracteosum* by the absence of cilia on the bracteoles.

31. *D. arcuatum* N. Busch. in Fl. cauc. crit. III, 3 (1903) 71.

Perennial; stem ca. 80-100 cm high, ribbed, densely covered from the very base with short reflexed crisp semiappressed hairs and with sparser, longer hairs; petioles pilose, not broadened at base; leaves rounded-reniform, slightly pubescent above, paler and more densely pubescent beneath, dissected to considerably below the middle into 3 lobes (dissection terminating 1-1.8 cm from base); middle lobe elongate-rhombic, dissected to about the middle into 3 lobes of the second order, the middle one ovate-lanceolate and cleft into 3 lobules, the terminal lobule with 2-3 lateral denticles, the lateral lobule 2-3-toothed; the 2 lateral lobes irregular, with an unequally 4-5-toothed margin; lateral lobe of the first order declinate from the middle and dissected to below the middle into 2(3) lobes of the second order, resembling the blade; raceme dense, usually branched at base; pedicels stout or stoutish, arcuately ascending, the lower usually 3-4.5 cm long, the upper 1-2 cm long, with an extremely dense pubescence of three kinds of hairs: 1) short, horizontally spreading, glandular, 2) similar but utriculately inflated at base, not glandular, and 3) sparse, simple, slender, long flexuous hairs; lower bracts resembling cauline leaves, the upper lanceolate, densely pilose; bracteoles close to flower, ovate-lanceolate or ovate, 6.5-12 mm long, 2.5-3.5 mm broad, rather obtusely acuminate, pilose; flowers more or less widely gaping, tepals violet-blue, broad-obovate (upper lateral) or ovate-lanceolate (lower lateral and upper median tepal), obtuse, 1.6-2.1 cm long, 0.6-1.2 cm broad, with white ciliiform hairs at the margin, glabrous or glabrate on the inside (with only isolated white hairs), the outside (as also the spur) with characteristic, rather sparse pubescence of short perpendicularly spreading hairs, some of these utriculately broadened or bearing short terminal glands, with an admixture of simple, more or less flexuous long slender hairs; spur usually sub-horizontal, with a slightly curved acuminate tip, 1.2-1.5 cm long; young follicles with scattered hairs. August.

Subalpine meadows. — Caucasus: Dag. Endemic. Described from the vicinity of Kurush mountain village. Type in Leningrad.

32. *D. ossecitum* N. Busch in Bull. Ac. Sc. URSS (1931) 449.

Perennial; stems tall, to 1 m or slightly higher, roughened by spreading simple white hairs; petioles densely pilose, not broadened at base; leaves similar in shape to those of *D. flexuosum* and *D. bracteosum* but with a dense soft pubescence of short more or less appressed hairs, especially above, and longer ones along the veins beneath; raceme rather dense, branched at base; axis densely squarrose-pilose; middle and upper bracts entire lanceolate, long-pilose, as are the obliquely ascending pedicels; bracteoles with very dense, long white hairs beneath and at the margins, ovate or ovate-elliptic or ovate-lanceolate, rather obtusely acuminate, usually 7–10 mm long, 3–5.5 mm broad; flowers rather small, blue, not widely gaping; tepals 1.5 cm long, with very long spreading simple white hairs on the outside; spur about as long as tepals; follicles glabrous. July–August.

Forest margins near the timberline. — Caucasus: E. Transc. (Ossetia). Endemic. Described from the Chaparukh River gorge. Type in Leningrad.

Note. Authentic specimens consist of plants with still unopened flowers. Hence, the dimensions of the flower parts given in the author's diagnosis are too small.

Series 10. *Flexuosa* Nevski. — Tall plants with a slightly developed pubescence of simple hairs; leaves not cuneate and not tapering into petiole, dissected to considerably below the middle into elongate-rhombic lobes; flowers of medium size, violet-blue or dark blue, not widely gaping, in a dense raceme usually branched proximally; bracteoles linear or linear-lanceolate. Spur about as long as tepals; follicles 3, glabrous or else ciliate along the sutures.

141 33. *D. flexuosum* M. B., Fl. taur.-cauc. II (1808) 12; III (1819) 369; Boiss., Fl. Or. I, 92; N. Busch in Fl. cauc. crit. III, 3, 65, pro parte. — *D. ciliatum* Stev. in Ind. sem. Hort. Dorpat. (1811); Huth, Monogr. p. 404, pro parte. — *D. elatum* c. *subciliatum* Ldb., Fl. Ross. I (1842) 64. — *D. mariae* N. Busch in Bull. Acad. Sci. URSS (1931) 452, non in Fl. cauc. crit. III, 3 (1903) 69. — Ic.: M. B., Cent. pl. rar. Ross. II, tab. 64; Treviran., Delph. et Aquil. (1817) tab. 1. — Exs.: Pl. Or. exs. No. 333.

Perennial; stem tall, in lower part more or less angular in cross section, with few reclinate setose hairs or glabrate, usually slightly flexuous; leaf petioles, especially at the margins, with sparse long (2.5(3) mm long) white cilia, these more numerous at base of blade and at point of attachment to stem; leaf blade rounded-reniform or rounded-cordate, deeply dissected into 3 lobes to 1–1.5 cm from base; middle lobe elongate-rhombic, usually 6–8(12) cm long, 3.5–4(5) cm broad, cleft into 3 lobules, the middle lobule ovate-rhombic, attenuate-acuminate, the margins incised into many ((4)7–9 on each side) lanceolate acute and slightly upcurved teeth or 2–3 dentate segments, the lateral lobules short and incised into apically diminishing dentate segments or teeth; lateral lobes of the leaf blade dissected to below the middle into 2–3 lobes of the second order, shorter than the middle lobe of the first order but especially the upper lobe resembling it in type of

cleavage; leaves glabrous above, glabrous or with sparse ciliiform hairs along the veins beneath, margins short-ciliate; upper leaves borne on short petioles with long-ciliate margins; lower bracts more or less dissected, resembling upper leaves, the upper bracts linear-lanceolate or linear, their margins almost always with very long and numerous rigid cilia; pedicels usually glabrous or else with ciliiform hairs, more or less declinate, 1–2 cm long; bracteoles close to flower, linear or linear-lanceolate, rarely lanceolate, more or less ciliate, rarely glabrate or glabrous, 4–6 cm long, 0.8–1.75 mm broad, rather obtusely acuminate; flowers intensely dark blue, sometimes with a conspicuous violet tinge; tepals glabrous, with long white cilia at the margins, very rarely more or less pubescent on the inside (var. *dasyanthum* Rupr.), obovate, (1.3)1.5–1.75(2) cm long, 0.8–1.3 cm broad; spur 1.4–1.9(2) cm long, straight or else slightly recurved near the more or less acuminate tip. July–August.

Subalpine meadows and upper part of forest zone. — Caucasus: Cisc., Dag., E., W., and S. Transc. Endemic. Described from Georgia. Type in Leningrad.

142 Note. A rare form with pubescent outer surface of tepals (*D. flexuosum* var. *dasyanthum* Rupr.; *D. elisabethae* Busch in Acta Inst. Bot. Acad. Sc. URSS, ser. I, 3 (1937) 355, 357) is identical with *D. bracteosum* described by N. A. Bush under the name *D. osseticum*, and like it, may be separated as an independent species. Specimens collected by Ruprecht have glabrate stems and leaves, but the latter may be pubescent in this form as in *D. osseticum*, and only the linear shape of the bracteoles enables it to be distinguished from the present species.

Series 11. **Pyramidata** Nevski. — Tall plants, inflorescence with a glandular pubescence; leaves not cuneate and not tapering into petiole, dissected to considerably below the middle into elongate-rhombic lobes; flowers of medium size, pale azure or pale blue, on very long arcuately spreading slender pedicels in a simple or usually proximally branched raceme; bracteoles narrow-linear, very remote from the flowers; spur about as long as or slightly shorter than tepals; follicles 3, glabrous.

34. *D. pyramidatum* Albov in Trudy Odessk. Otd. R. Obshch. Sadov. (1891) 5; N. Busch in Fl. cauc. crit. III, 3, 71. — *D. elatum* γ *pyramidatum* Huth, Monogr. (1895) 399, pro parte. — *D. flexuosum* var. *glandulosum* O. Kapeller ex Grossh., Fl. Cauc. II (1930) 100.

Perennial; stem 1–1.5 m high, glabrous or glabrate to base of inflorescence; inflorescence axis with a dense pubescence of short spreading hairs, many of these utricularly broadened or with terminal glands; petioles pilose, not broadened proximally; leaves resembling in shape those of *D. flexuosum* or *D. bracteosum*, with elongate narrow lobes incised into small teeth, the leaves short-pubescent beneath or on both surfaces; inflorescence usually a basally branched raceme with spreading long (2–8 cm long) arcuately ascending pedicels; bracts linear, considerably shorter than pedicels, pilose; pedicels with a short very dense pubescence of spreading hairs interspersed with numerous basally inflated yellowish

glandular hairs; bracteoles to 1.1 cm long and ca. 0.75 mm broad, 5–15(20) mm distant from base of flower, pilose; tepals obovate obtuse, (1.2)1.5–1.8 cm long and 1 cm wide with a pubescence of simple hairs on the outside or on both surfaces or else glabrous; spur 1.2–1.5 cm long, more or less acuminate, slightly recurved. July–August.

Subalpine meadows. — Caucasus: W. Transc. Endemic. Described from Abkhazia. Type in Tbilisi?

143 Series 12. *Crispula* Nevski. — Stem ca. 75 cm high, with a more or less developed pubescence of simple hairs; leaves not cuneate and not tapering into petiole, dissected almost to base into narrow lobes; flowers numerous, medium-sized, blue or violet-blue, not widely gaping, in a dense simple or basally branched raceme; bracteoles linear-subulate or rarely narrow-lanceolate or lanceolate; spur slightly or almost two-thirds as long as, rarely as long as tepals; follicles 3, densely pilose or glabrous but sometimes ciliate along the sutures.

35. *D. crispulum* Rupr. in Fl. Cauc. (1869) 34. — *D. speciosum* var. *linearilobum* Trautv. in A.H.P. IV (1876) 102. — *D. linearilobum* N. Busch in Fl. Cauc. crit. III, 3 (1903) 68. — *D. linearilobum* var. *crispula* N. Busch, l.c. — *D. tomentellum* N. Busch, l.c., 70. — *D. speciosum* var. *dasycarpa* N. Busch, l.c., 65, pro parte. — Exs.: Fl. cauc. exsic. No. 7; Pl. Or. exs. No. 305 (sub nom. *D. linearilobum*).

Perennial; stem 40–70 cm high, faceted, densely leafy, usually covered with a dense tomentum of extremely short crisp reclinate appressed hairs; petioles of lower leaves very long, slightly broadened basally, pubescence as that of stem; leaves rounded-cordate or rounded-reniform in general outline, dissected almost to base (to 2–5(7–9) mm from base) into 3 lobes; middle lobe elongate-rhombic-lanceolate, deeply dissected into 3 lobes of the second order, the middle one linear with 2–4(6) narrow-linear spreading long lateral teeth, the lateral ones linear, irregular, with 2 unequal narrow-linear teeth or with a tridentate lobule replacing the distal tooth; lateral lobes of the leaf blade very deeply dissected into 2 lobes of the second order, similar to the middle lobe of the first order; both surfaces of leaves with a dense, often tomentose pubescence as on stem, axis, inflorescence, pedicels, bracts, and bracteoles; bracts linear; bracteoles 5–9 mm long, 0.5–1.5 mm broad, linear-subulate, more rarely narrow-lanceolate, ca. 2 mm broad; flowers blue or pale blue, not very widely gaping; tepals obovate obtuse, 1.5–1.9 cm long and 0.6–1(1.5) mm broad; tepals and spur densely covered with short crisp appressed hairs on the outside, glabrous or slightly pilose on the inside; spur almost straight, 1.1–1.5 cm long, ca. 3–3.5 mm wide proximally; follicles densely pilose. July–August.

In high-mountain meadows on stony soil and on moving taluses in the alpine zone. — Caucasus: Dag. E. and S. Transc. Gen. distr.: Arm.-Kurd. Described from the vicinity of Danuch (a mountain village) (Gumbet). Type in Leningrad.

Note. Ruprecht considered this plant as a species of a narrow taxonomic range, certainly not as a variety of *D. flexuosum*, as has been claimed by N. A. Bush. Thus the new name, *D. linearilobum*, proposed by Bush,

is superfluous. It seems impossible to distinguish *D. tomentellum* N. Busch from *D. crispulum* by leaf division, which in our opinion is identical, either by degree of pubescence or by bracteole shape.

36. *D. buschianum* Grossh. in Trudy Azerbaidzhan. Otd. Zakavk. Filiala Akad. Nauk SSSR I (1933) 51. — *D. linearilobum* var. *hirticaule* Grossh., Fl. Cauc. II (1930) 99.

144 Perennial; stem ca. 75 cm high, more or less faceted, in lower half rather sparsely covered with reclinate simple white hairs 0.75 mm long, glabrous or glabrate from below the inflorescence; petioles with scattered hairs; leaves rounded-cordate or suborbicular, glabrous on both surfaces or slightly pubescent along the veins beneath (sometimes also above), dissected almost to 3–6 mm from base into 3 lobes; middle lobe rhombic-lanceolate, attenuate-acuminate, dissected to the middle or slightly deeper into 3 lobules, the middle lobule linear or linear-lanceolate, with 2–4 pairs of lateral, apically diminishing, linear or triangular-linear elongated or spreading teeth, terminating in a linear elongated rather obtusely acuminate tooth, the lateral lobules irregular, cleft into 2 unequally bidentate segments; lateral lobes of the leaf blade dissected almost to base into 2 lobes of the second order resembling the middle lobe of the first order; raceme rather dense, usually simple, narrow; pedicels and bracts glabrous, bracts rarely ciliate at the apex; bracteoles 5–7 mm long, ca. 0.75 mm broad, linear subacute, glabrous or scarcely ciliate, close to flower; flowers dark blue or violet-blue, not very widely gaping; tepals ovate, 1.2–1.5 cm long, ca. 0.7–0.8 mm broad, obtuse, quite glabrous on the outside, the lower half of the inner surface with a white tomentum of long tangled hairs or with at least a few hairs, sometimes slightly ciliate at the apex; spur 1–1.5 cm long, often with hamate tip; follicles glabrous, more or less ciliate along the sutures. July–August.

Subalpine treeless zone. — Caucasus: S. Transc. Endemic. Described from the shores of Lake Sevan. Type in Baku.

37. *D. mariae* N. Busch in Fl. Cauc. crit. III, 3 (1903) 69.

145 Perennial tall plant; stem angular and sulcate, slightly flexuous, in lower half slightly pubescent; petioles not broadened or scarcely broadened basally with crisp hairs; leaves rounded-cordate, dissected almost to 5 mm or slightly less from base into 3 lobes; middle lobe elongate-rhombic, dissected to about the middle into 3 lobes of the second order, the middle one lanceolate, with 2–3 pairs of declinate lateral teeth and a long linear-lanceolate, rather obtusely acuminate terminal lobule, the lateral secondary lobes smaller, usually only on the outside unequally 2–4-toothed; lateral lobes of the leaf blade dissected to considerably below the middle into 2 lobes of the second order which resemble the middle lobe of the first order; raceme many-flowered, rather loose, more or less branched at base; bracts linear, glabrous, shorter than the glabrous pedicels; pedicels obliquely ascending, the lower 3–3.5 cm long; bracteoles lanceolate, quite glabrous, ca. 7–9 mm long, 1.75–2 mm broad, rather obtusely acuminate, close to flower; flowers rather large, violet-blue, not very widely gaping; tepals glabrous on the outside, ciliate-margined, usually with sparse ciliate hairs on the inside, elliptic-ovate or broad-ovate, obtuse, 2–2.5 cm long to 1.2 mm broad; spur 1.5–1.7 cm long, subhorizontal, with an acuminate recurved tip; follicles glabrous. July–August.

Subalpine meadows and forest margins near the timberline. — Caucasus: Dag. Endemic. Described from the vicinity of Tsudakar and Balkar mountain villages in the [former] Darginskii District. Type in Leningrad.

Note. This plant has no connection with *D. lepidum* Fisch. et Lall., to which it was compared by N. A. Bush. Fischer's species is no more than a form or hybrid of the Daurian *D. triste*.

Series 13. *Inconspicua* Nevski. — Stems not higher than 1 m, usually much shorter, with a dense pubescence of simple hairs, sometimes with a greater or lesser admixture of glandular hairs, densely leafy; leaves not cuneate and not tapering into petiole, dissected to below the middle into lobes with obtuse terminal teeth; flowers not large, blue or violet-blue, numerous, in a simple more or less dense raceme. Bracteoles linear-filiform. Spur slightly shorter than or about as long as tepals; follicles 3, glabrous.

38. *D. inconspicuum* Serg. in Animadv. System. ex Herb. Univ. Tomsk. No. 4 (1930) p. 6. — Ic.: Seg., l.c., tab. pag. 8 opp., fig. sinistr.

Perennial; stems 2-4, 25-100 cm high, very densely leafy right up to the inflorescence and covered with short soft spreading simple and partly glandular hairs, these more abundant in upper part and especially on the inflorescence axis; leaves rounded-cordate, rarely rounded-reniform, cordate, 2.5-7 cm long and 3.5-14 cm broad, with short unappressed hairs on both surfaces, light green above, even lighter grayish green beneath, palmatipartite; leaf blade dissected to about five-sixths or sometimes deeper into 3 lobes, the middle lobe rhombic and dissected to one-third or half its length into 3 lobules, the middle lobule long, 3(5-7)-toothed or cleft into 3 segments (the middle segment tridentate, the lateral bidentate, with dissimilar teeth), the lateral lobules unequally 2-3-toothed, sometimes with a tridentate segment instead of the distal largest tooth; lateral lobes of the leaf blade broad, dissected to slightly below the middle into 2(3) lobes of the second order, rhombic or irregularly rhombic, more or less resembling the middle lobe of the first order; petioles of lower leaves broadened at base; slightly longer than or twice as long as the blade, petioles of middle leaves as long and those of upper leaves half as long as the blade; raceme very dense, 3.5-14(17) cm long; lower bracts large, similar to upper leaves, other bracts lance-linear; bracteoles linear-filiform, 7-18 mm long, ca. 0.4-0.5 mm broad; pedicels, bracteoles and surface of tepals covered with very long (1-2 mm long) simple white hairs as well as with 1) very short simple hairs, somewhat broadened in their lower part and 2) glandular hairs; tepals blue or azure, rarely with a more or less conspicuous violet tinge, ovate obtuse, 0.8-1.8 cm long, 0.5-0.9 cm broad, glabrous on the inside; spur 1.1-1.3 cm long, ca. 2.5 mm wide, usually horizontal and terete, obtuse; follicles 3(5), ca. 1.2 cm long; seeds with narrow wings on the ribs. July-August.

Grass plots in the alpine and subalpine zone. — W. Siberia: Alt. Gen. distr.: NW Mong. Described from the vicinity of Katon-Karagai. Type in Tomsk.

39. *D. ochotense* Nevski, sp. nova in Addenda VI, p. 553. — *D. elatum* α subglabrum Rgl. et Tiling in Nouv. Mem. Soc. Nat. Mosc. XI (1859) 39.

Perennial; stem 25–50 cm high, entirely covered with short soft simple hairs, with an infinitesimal admixture of glandular and inflated hairs, rather densely leafy; petioles pilose; leaves rounded-cordate or rounded-reniform, with obtuse or subobtuse broad-elliptic or lanceolate teeth, deeply cordate, dissected to four-fifths into 3 lobes, with almost converging margins; middle lobe broad-rhombic, cleft into 3 lobules, the middle lobule tridentate, the lateral bidentate; lateral lobes sometimes slightly overlapping the middle lobe, dissected to below the middle into 2–3 lobes of the second order, the upper resembling the middle lobe of the first order; leaf pubescence slightly developed, mainly along margins and veins; axis of the simple short raceme pubescent like the stem; pedicels very densely pubescent, almost exclusively with slender simple hairs of unequal length; bracteoles linear, 4–6 mm long, pilose; pedicels bright blue; tepals ovate or ovate-lanceolate, obtuse, (1.3)1.5–2(2.2) cm long, 5–9 cm broad, with few spreading white hairs on the outside and at the margins; spur horizontal with a more or less curved tip or almost straight, 1.2–1.8 cm long. July–August. (Plate X, Figure 5).

Meadows and shrub thickets in river valleys. — E. Siberia: Lena-Kol. (lower reaches of the Lena); Far East: Okh. Endemic. Described from the vicinity of Ayan. Type in Leningrad.

40. *D. cryophilum* Nevski, sp. nova in Addenda VI, p. 553. — *D. elatum* var. *intermedium* f. *hirsuta* Pohle in herb.

147 Perennial; stem 20–65 cm high, to 7.5 mm thick at base, hispid throughout its length, with slightly reclinate rather dense short (1.5 mm) hairs below and rather sparse long (2.75 mm) hairs in the upper half; petioles and leaf blade (the latter especially beneath) hispid, the blade rounded-cordate, dissected to five-sixths into 3 lobes, the middle lobe rhombic, cleft to the middle into 3 lobules, the middle lobule with 3–5 conical-lanceolate, rather obtusely acuminate teeth, the middle tooth larger, the lateral lobules with 2–4 unequal teeth; lateral lobes of the leaf blade separated from the middle lobe by large lacunae, dissected to between two-thirds and three-fourths into 2–3 lobes of the second order, the upper resembling the middle lobe of the first order; raceme simple, rather dense, to 20 cm long, with rather numerous violet-blue flowers; floral axis with sparse setose hairs, 3 mm long; pedicels slightly spreading, 1–4 cm long, rather sparsely beset with 2–2.25 mm long spreading hairs covering the entire plant, but lacking hairs of a different kind; bracteoles near flower, linear-subulate, ca. 5 mm long, ca. 0.4–0.5 mm broad; tepals glabrate, with few setose hairs on the outside near the apex, ovate, 1.2–1.5 cm long, 0.4–0.65 cm broad, obtuse; spur subhorizontal, ca. 1.3–1.4 cm long. August.

Argillaceous herb-covered slopes in the tundra. — Arctic: Arc. Eur. Endemic. Described from Kolguev Island. Type in Leningrad.

Series 14. *Elata* Nevski. — Stems very tall, without or almost without hairs, sometimes with short utricularly inflated yellowish hairs confined

to the inflorescence; leaves not cuneate and not tapering into petiole, dissected to below the middle into rhombic lobes with acute terminal teeth; flowers not large, blue; spur usually as long as the tepals; follicles 3, glabrous; seeds with narrow-winged ribs, smooth on the sides.

41. *D. elatum* L., Sp. pl. (1753) 531; Ldb., Fl. Ross. I, 63, pro parte; Turcz., Fl. baic.-dah. I, 75; Kryl., Fl. Zap. Sib. V, 1141. — *D. palmatifidum* DC., Syst. nat. I (1818) 358. — *D. glabellum* Turcz. in Bull. Soc. Nat. Mosc. X (1837) 56, nomen. — *D. alpinum* Huth, Monogr., (1895) 405, pro parte. — *D. discolor* Fischer in Sweet, Hort. Brit. ed. II (1830) 9, nomen. — Ic.: Schlecht., Lang. et Schenk, Fl. Deutschl. ed. 5, XI, tab. 1078 (1882); Syreishchikov, Ill. Fl. Mosk. gub. II (1907) p. 139, fig. sinistr. — Exs.: Fl. exs. austro-hung. No. 2904.

Perennial— stem 80–200 cm (some authors, to 400 cm) high, hollow, glabrous or with sparse reclinate hairs in lower part; axis of inflorescence as well as pedicels, bracteoles, and outer surface of tepals quite glabrous or the inflorescence with short yellowish utricularly inflated hairs; leaves usually orbicular or rounded-cordate in their general outline, deeply cordate, with convergent outer lobes, glabrous or else pilose at margins and along veins (but usually only beneath), usually 8–9 cm long, 15–16 cm broad; leaf blade dissected to four-fifths or slightly deeper into 3 lobes, the middle lobe oblong-rhombic, its upper half incised into large unequally acuminate teeth; lateral lobes broadly dissected to two-thirds into 2–3 rhombic lobes of the second order, the 1–2 upper on each side resembling the middle lobe of the first order, the outer smaller and irregular; petioles of middle and lower leaves 3–15 cm, about as long as or 1.5–2 times as long as the blade, mostly glabrous or sparsely hispid; raceme not dense, simple, or branched in lower part; bracts narrow-linear entire, only those of lower flowers sometimes larger and incised; bracteoles linear-subulate or linear-filiform, 5–7 mm long, 0.33 mm broad, close to flower; tepals 1.1–1.3(1.5) cm long, ovate or elliptic. July–August. (Plate X, Figure 3).

Rather sparse, mixed, and birch-and-aspen forests, margins and clearings, forest ravines, meadows with tall herbaceous vegetation, and shrubs in river valleys. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U.V., V.-Kama, V.-Don; W. Siberia: Ob, Irt., Alt.; E. Siberia: Ang.-Say., Dau. Lena-Kol.; Centr. Asia: Dzu.-Tarb., T. Sh. (E.). **Gen. distr.:** mountains of Centr. Eur., N. Mong. Described from Siberia. Type in London.

Series 15. *Cuneata* Nevski. — Stems tall, more or less densely covered with simple hairs; leaves cuneate, tapering into petiole, dissected to below the middle into lobes; flowers numerous, in a dense, simple or basally branched raceme, not large, blue; spur usually as long as the tepals. Bracteoles of varying shape; follicles 3, glabrous or pilose.

42. *D. cuneatum* Stev. ex DC., Syst. nat. I (1818) 359. — *D. cuneatum* β *publiflorum* DC., l.c., 546. — *D. ucranicum* Fisch., ined. — *D. elatum* γ Ldb., Fl. Ross. I (1842) 64. — *D. elatum* var. *cuneatum* Schmalh., Fl. I (1895) 29. — *D. pubiflorum* Huth in Engler, Bot. Jahrbüch. XX (1895) 417, non Turcz. — *D. Englerianum* Huth, l.c., 418,

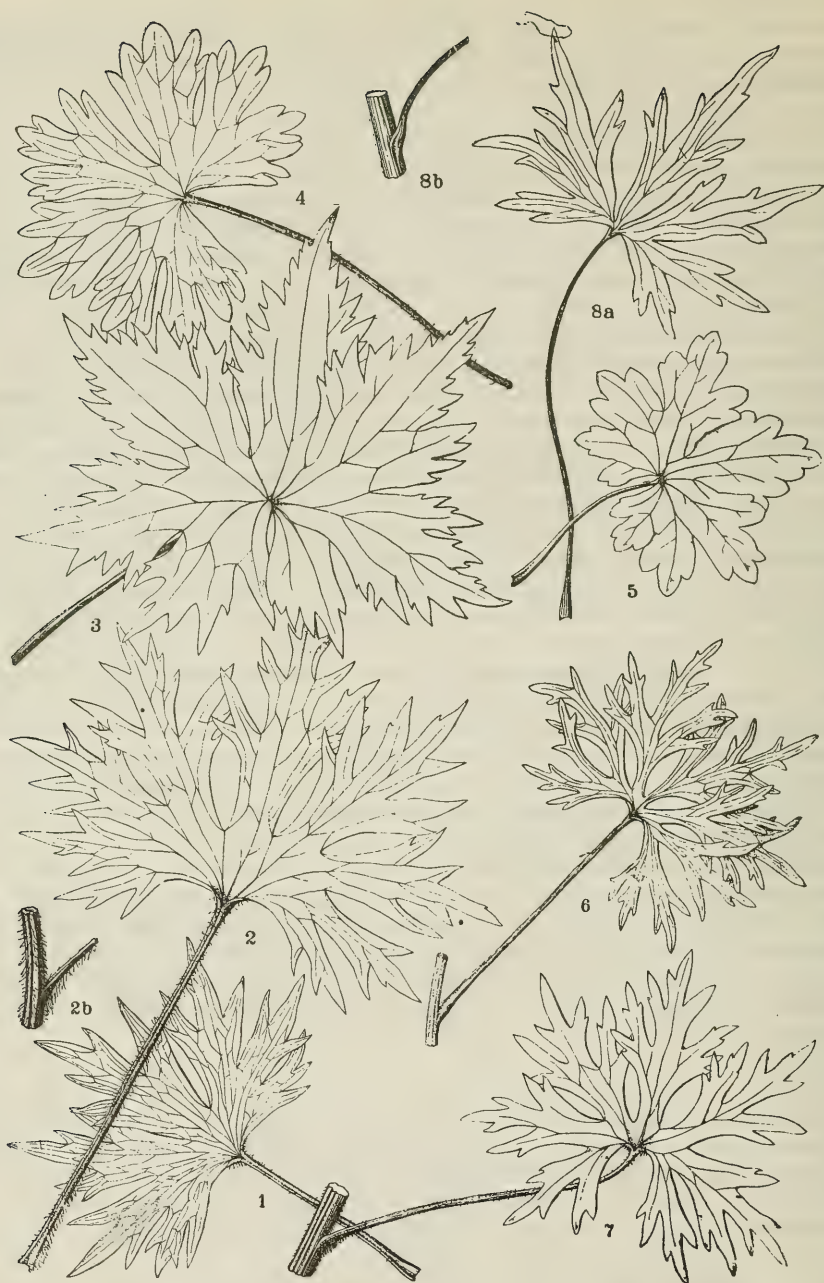


PLATE X. 1—*Delphinium cuneatum* Stev.; 2—*D. retropilosum* (Huth) Sambuk: a) leaf, b) part of stem with base of petiole.—3—*D. elatum* L.; 4—*D. crassifolium* Schrad.; 5—*D. ochotense* Nevski; 6—*D. triste* Fisch.; 7—*D. dictyocarpum* DC.; 8—*D. cheilanthum* Fisch.; a) leaf, b) part of stem with base of petiole.

pro parte. — *D. duhmbergii* Huth, l.c., 402, pro parte. — *D. rossicum* Litw. in P. Majewski, Fl. Sr. Ross., ed. V (1917) 24, non Rouy. — *D. centrороссicum* Litw. ex Sambuk. in Journ. Soc. Bot. Russ. XIV (1929) 423, nomen. — *D. litwinowi* Sambuk, l.c., 421. — Ic.: Sambuk, l.c., fig. 2; Delessert, Ic. pl. I (1820), tab. 61. — Exs.: HFR No. 702.

Perennial; stem 50–120 cm high, more or less ribbed, reddish violet, glabrate or with few spreading white hairs below, with a short soft appressed pubescence below the raceme and on the floral axis, rarely stem glabrous, leafy up to the bracts; leaves rounded-reniform, cuneate (especially the upper), appressed-pubescent mainly at the margins and along the veins, dissected almost to base into 3 lobes, the middle lobe rhombic and dissected to the middle or slightly deeper into 3 lobules, the middle lobule terminating in 3 linear or linear-lanceolate acuminate segments and sometimes with 1–2 lateral denticles, the lateral lobules terminating in 2 linear-lanceolate segments, these, too, sometimes with 1–2 lateral denticles; lateral lobes of the leaf blade dissected into 2–4 lobes of the second order, resembling the middle lobe of the first order; petioles mostly ciliate-pilose, scarcely broadened proximally; lower bracts entire, sometimes tripartite; pedicels densely appressed-pubescent, rarely glabrous; bracteoles ovate-lanceolate or lanceolate or ovate or else linear, 5–7 mm long, to 2.5 mm broad; tepals densely pubescent, rarely glabrous on the outside, ovate, 1.2–1.5 cm long, ca. 0.8–0.9 cm broad, obtuse; spur 1.3–1.4 cm long, 3 mm wide proximally, rather obtusely pointed and more or less recurved near the tip; follicles appressed-pubescent or glabrous. July–August. (Plate X, Figure 1).

Forest margins transformed into steppe and steppe slopes with shrubs. — European part: U. V. (Oka), V.-Don, L. Don, Transv., M. Dnp. Endemic. Described from the vicinity of Krasnoarmeisk ([formerly] Sarepta). Type in Helsinki? Cotypes in Geneva and Leningrad.

Note. A study of the extensive material of this species provided by De Candolle raises serious doubts as to the validity of the division into pubescent and nonpubescent forms. De Candolle rendered Steven a disservice in referring a garden plant without pubescence to his species; indeed, he admitted his error in a note in the Addenda, where he states that the plant provided by Steven and growing wild around Sarepta near the Volga differs from the garden specimens by a dense velutinous pubescence on its pedicels, bracteoles, outer surface of tepals, and young follicles. He recorded it as *D. cuneatum* β *pubiflorum*. Thus there is no doubt that *D. cuneatum*, as used by Steven, is identical with *D. rossicum* Litw. The publication of the latter, as well as the description of *D. litwinowi* Sambuk, leads us to the conclusion that an unfortunate misunderstanding occurred. In any case, even if the hairless form of *D. cuneatum* is recognized as a separate species, the name *D. cuneatum* must be retained for *D. litwinowi* and a new name proposed for the glabrous form (*D. elatum* var. *transchelii* Litw.). It appears that *D. cuneatum* is also identical with *D. kiovense* Bess. (ex Nym., Cons. 20).

43. *D. retropilosum* (Huth) Sambuk in Journ. Soc. Bot. Russ. XIV (1929) 418. — *D. duhmbergii* var. *retropilosum* Huth in Engler, Bot. Jahrbuch. XX (1895) 402. — *D. pterospermum* Turcz., ined. — Ic.: Sambuk, l.c. fig. 1.

Perennial; stems 65–80 cm high, more or less intensely purple-violet and strongly ribbed, in lower part or throughout their length (including raceme densely covered with 2–3 mm-long rigid spreading recurved hairs, densely leafy; petioles hispid, not broadened at base, those of middle and lower leaves as long as or slightly longer than the blade; leaf blade rounded-reniform or rounded-cordate, more or less cuneate, 3–8 cm long, 4–12 cm broad, dissected almost to base into 3 lobes, the middle lobe oblong-rhombic, dissected almost to the middle into 3 lobules, the middle lobule apically tridentate, with lanceolate or linear-lanceolate teeth, the middle tooth longer and larger, the lateral lobules apically bidentate, with dissimilar teeth; lateral lobes of the leaf blade dissected to considerably below the middle into 2–3 rhombic lobes of the second order, resembling the middle lobe of the first order, the leaf being palmatisect; leaf margins and veins (the latter mainly on underside of leaves) with long rigid hairs. Raceme many-flowered, simple or more or less branched at base, narrow; bracts mostly entire, ciliate-margined, lanceolate; bracteoles ovate or ovate-lanceolate, often blue, subobtusate, 5–9 mm long, 2.5–5 mm broad, ciliate-margined, close to flower; tepals glabrous, more or less hairy only at upper margin, ovate, 1–1.2 cm long, 0.5–0.8 cm broad, obtuse; spur sub-horizontal, 9–11 cm long, ca. 2 mm wide with a recurved obtusely pointed tip; follicles 3, (8)11–15(17) mm long, glabrous, reticulate; seeds trigonous, with narrow membranes on the ribs. July–August. (Plate X, Figure 2).

Forests, floodland and steppe meadows, sparse insular birch groves, and more rarely pinewoods. — W. Siberia: Irt., Ob; E. Siberia: Ang.-Say. (W.). Endemic. Described from the area between the village of Borovyanka and Vasina in the former Kuznetsk County. Type in Leningrad.

44. *D. villosum* Stev., ex DC. Syst. nat. I (1818) 546, non Huth, Monogr., 411. — *D. rha* N. Schipcz. in herb.

153 Perennial; stem to 100–120 cm high, usually glabrous, the inflorescence axis with right-angled or almost right-angled spreading simple setose hairs; petioles with few setose hairs; leaves as in *D. cuneatum* but often larger and with broader lobes, with hairs along margins and along the veins beneath; raceme loose, slightly branched at base; bracts linear, entire, or the lower tripartite, hispid; pedicels hispid, with right-angled spreading white hairs, such hairs also covering the bracteoles and the outside of the tepals; bracteoles linear-subulate or linear-filiform, 5–6 mm long, ca. 0.75 mm broad; tepals ovate obtuse, ca. 1.3–1.4 cm long; spur 1.5–1.9 cm long, ca. 3–3.25 mm wide, obliquely ascending or subhorizontal, straight; follicles 3, densely pilose when young. July.

Wooded slopes in river valleys. — European part: U. V. (near the village of Krasnoe in the former Rybinsk County). Endemic. Described from cultivated specimens. Type in Helsinki? Cotype in Geneva.

Series 16. *Crassifolia* Nevski. — Plants with a pubescence of rigid setose simple, usually very well developed hairs; leaves concentrated at base or in lower part of stem, with rigid appressed hairs over entire length, not cuneate and not tapering into petiole, dissected to below the middle into lobes; flowers not large, violet-blue or dingy violet, the spur as long as or slightly longer, rarely shorter than the tepals; bracteoles linear or lanceolate; follicles 3, glabrous or pilose.

45. *D. korshinskyanum* Nevski, sp. nova in Addenda VI, p. 553. — *D. elatum* Korsh. in A. H. P. XII, p. 299, non L.

Perennial; stem 55–125 cm high, to 8 mm thick at base, green, with small violet spots, covered below and in middle part with very dense long setose slightly reclinate rigid white hairs 2.5–3 mm long, upper part of stem below inflorescence glabrous; inflorescence axis glabrous or with sparse white bristles; petioles hispid, slightly broadened at base; leaves rounded-cordate, appressed-pilose above, with long setose hairs, mainly along the veins, beneath, dissected to considerably below the middle into 3 lobes, the middle lobe rhombic, dissected to the middle into 3 lobules, the middle lobule rhombic, cleft into 3 unequally dentate segments (the middle one tridentate, the lateral bidentate), the 2 lateral lobules cleft into two 2–3-toothed segments; lateral lobes of the leaf blade dissected to below the middle into 3 lobes of the second order, resembling the middle lobe of the first order; inflorescence a simple or proximally slightly branched raceme; flowers dark blue, bracts linear, more or less ciliate-pilose-margined, shorter than the glabrous pedicels; pedicels of lower flowers to 4–4.5 cm, those of upper flowers 1–1.2 cm; bracteoles linear or linear-lanceolate, often colored, close to flower, acuminate, with more or less numerous long cilia at the margin; tepals ovate, 1.1–1.4 cm long and 0.4–0.7 cm broad, obtuse; spur subhorizontal, glabrous or hispid, 1.3–1.5 cm long, 3 mm wide proximally, acuminate, usually curved upward but not downward; follicles reticulate glabrous, 1.3–1.4 cm long. July.

Meadows among shrub thickets on river banks. — Far East: Ze.-Bu. Gen. distr.: Manchuria (Heilungkiang Province). Described from the vicinity of the village of Ivanovskoe between the Zeya and Bureya rivers. Type in Leningrad.

Note. This species appear to be a connecting link between the groups *D. crassifolium* and *D. retropilosum*. From the former it is distinguished by the disposition of the leaves on the lower half of stem, and their concentration at its base. From the latter, it differs in that the stem is not evenly leafy up to the inflorescence, and that the leaves are not hispid above nor cuneate. F. V. Sambuk, in his herbarium, stated it to be closely related to *D. retropilosum*, but without proposing a name.

46. *D. crassifolium* Schrad., ex Spreng., Gesch. Bot. II (1818) 201; Huth, Monogr., 401, pro parte. — *D. crassicaule* Ldb., Fl. Ross. I (1842) 62. — *D. strictum* Lessing, ined. — Ic.: Gmelin, Fl. Sib. IV (1769), tab. 79.

Perennial; stems cylindric, 30–75 cm high, more or less violet, covered throughout their length with long (2 mm long) white more or less reclinate hairs; leaves almost all concentrated at base of stem, with long hispid petioles; leaf blade rounded-cordate or rounded-reniform or suborbicular, with a rather sparse pubescence of appressed hairs on both surfaces, dissected to about three-fourths of their length into 3 lobes, the middle lobe obovate, cleft to one-third into 3 lobules, the middle lobule terminating in 3 lanceolate-elliptic teeth, the lateral each with 2–3 unequal teeth; lateral lobes of the leaf blade broad, dissected to below the middle into 2–3 lobes of the second order, the upper resembling the middle lobe of the first order, the terminal teeth rather obtusely acuminate or very slightly attenuate; raceme narrow and simple, with erect, scarcely declinate, glabrous or hispid

pedicels longer than the linear, rarely bracts tripartite; bracteoles linear, 5–7 mm long, ca. 0.5 mm broad, glabrous or with rigid hairs, more or less removed from flower; flowers violet or dark blue-violet; tepals ovate subobtusate, 1.2–1.5 cm long, 0.5–0.6 cm broad, glabrous or with spreading hairs on the outside, glabrous on the inside, margins sometimes sparsely ciliate; spur 1.4–1.8 cm long, (3–(3.5) mm wide proximally, subhorizontal, with a rather obtusely pointed recurved tip; follicles glabrous. July. (Plate X, Figure 4).

Forest margins, forest meadows, and shrub thickets. — E. Siberia: Ang.-Say., Dau., Lena-Kol. Gen. distr.: N. Mong. Described from Siberia.

155 Note. In Sprengel's work (l.c.) only a nomen nudum is given for this species, but since this is accompanied by a reference to an illustration in Gmelin's work, the publication of this species is justified.

47. *D. iliense* Huth in Engler., Bot. Jahrbüch. XX (1895) 402. — *D. duhmbergii* Huth in Bull. Herb. Boiss. I (1893) 330 et in l.c., pro parte. — *D. turkestanicum* Huth, Monogr. (1895) l.c., 420 pro pte. — *D. englerianum* Huth, l.c., 418, pro pte.

Perennial; stem 25–90 cm high, strongly ribbed, throughout its length (but more densely below) covered with long rigid recurved white hairs ca. 2–2.5 mm long, no other hairs present; leaves almost entirely concentrated at base of stem; petioles long, hispid; leaves flat, cordate or rounded-cordate, covered above with usually few thickish white appressed setose hairs directed toward apices of lobes, and covered beneath with a similar, but spreading indumentum, the blades dissected to below the middle into 3 lobes which do not overlap at the margins, the middle lobe obovate or subrhombic, shallowly cleft into 3 lobules, the middle lobule with 4–6 small rounded-elliptic subobtusate, very slightly apically attenuate teeth, the middle tooth larger than the others; lateral lobes of the leaf blade broad, divided to the middle into 2 lobes of the second order that resemble the middle lobe of the first order; leaves similar in shape to small leaves of the genus *Vitis*; raceme simple and narrow, pedicels glabrous or hispid, 1.5–3 cm long, more or less appressed to axis of inflorescence; bracteoles close to flower or slightly removed, lanceolate or linear-lanceolate, rather obtusely acuminate, 5–10 mm long, to 3 mm broad, with long rigid cilia along the margins, rarely on the dorsal surface; flowers blue-violet or violet; tepals glabrous or more or less densely covered on the outside with short stout white hairs, glabrous or glabrate on the inside, ovate or broad-ovate, 1.2–1.4 cm long, 0.6–0.8(1) cm broad, obtuse; spur 1.2–1.3 cm long, ca. 2.5–2.75 mm thick, subhorizontal, rather obtusely pointed and slightly recurved near tip; follicles slightly or sparsely pilose. June–August. (Plate IX, Figure 6).

Mountain meadows. — Centr. Asia: Dzu.-Tarb., T. Sh. (E.). Gen. distr.: Dzu.-Kash. Described from the Muzart Pass. Type in Leningrad.

Note. It seems that *Delphinium winklerianum* Huth (l.c., p. 419) from Kashgaria must also be considered a synonym of this species.

48. *D. corymbosum* Rgl. in A.H.P. VII (1880) 547; Huth, Monogr., 409 (excl. var. β). — *D. umbellatum* Rgl. in sched. — Ic.: Rgl., Gartenfl. tab. 1059. — Russian name: zhivokost' rekristaya [branched].

156 Perennial; stems 15–65 cm high, cylindric, throughout their length densely covered with only recurved, long (ca. 1.5–2 mm) rigid hairs; leaves almost entirely concentrated at base of stem, rounded-cordate, dissected to the middle into 3 lobes, the middle lobe obovate or broad-obovate, in the lower leaves obtuse, shallowly cleft into 3 unequally dentate lobules; lateral lobes transversely elliptic and cleft almost to the middle into 2 lobes of the second order resembling the middle lobe of the first order; leaf blade covered above with appressed setose hairs directed toward apexes of lobules, hispid beneath, mainly along the veins, with spreading hairs; petioles hispid, inflorescence thyrsoid, many-flowered, rarely depleted, with 5–6 flowers, almost umbelliform; flowers dingy pale violet; pedicels, bracts, and bracteoles hispid, the latter linear or narrow-lanceolate, acuminate, 5–7 mm long, ca. 1–2 mm broad, close to flower; tepals with long hairs on the outside, glabrous on the inside, 1.3–1.7 cm long, 0.6–1 cm broad, ovate obtuse; spur 1.2 cm long, subhorizontal, with a recurved tip; follicles densely pilose. July–August.

Mountain meadow slopes. — Centr. Asia: Dzu.-Tarb. Gen. distr.: Dzu.-Kash. Described from specimens grown from seeds collected by A. Regel, apparently in the Kuldja area. Type in Leningrad.

Series 17. *Latibracteata* Nevki. — Tall plants with a more or less developed indumentum of setose hairs; leaves not cuneate and not tapering into petiole, dissected to below the middle into lobes; flowers not large, blue-violet, the spur longer than the tepals; bracteoles elliptic, close to bracts; follicles 3, spreading-pilose or glabrous.

49. *D. maackianum* Rgl. in Mém. Acad. Pétersb. sér 7, IV (1861) 9; Huth, Monogr., 400. — Ic.: Rgl., Gartenfl. X (1861) tab. 344; Trans. Russ. Hort. Soc. 1861, tab. 70; Kom. and Alis., Oprod. rast. Dal'nevost. kr. I (1931) tab. 162.

157 Perennial; stem 55–80 cm high, cylindric, densely covered throughout its length with long reclinate setose hairs, or else glabrous and smooth to inflorescence; inflorescence axis with an extremely dense pubescence of right-angled spreading short setose hairs; leaves dissected throughout, rounded-reniform, cordate, usually 6–8 cm long, 11–16 cm broad, extremely densely appressed-hispid and scabrous or rarely glabrate on both surfaces, dissected to two-thirds into 3 lobes, the middle lobe obovate or rhombic-obovate, cleft to one-third into 3 oval lobules, the middle lobule with 7–9 marginal elliptic-lanceolate, rather obtusely acuminate teeth (the terminal tooth longer than the others), the middle lobules unequally 5–9-toothed at the margin; lateral lobes of the leaf blade dissected to about the middle into 2–3 lobes of the second order, the upper resembling the middle lobe of the first order; petioles hispid, rarely glabrous, broadened at base; raceme branched at base or simple, with arcuately ascending pedicels, 1.5–2.7 cm long; bracts broad-elliptic or elliptic or elliptic-lanceolate, glabrous, rarely pilose, 3–9 mm long, 2.5–5 mm broad, brown-purple, considerably shorter than the pedicels; bracteoles concolor with bracts, usually glabrous, to 5 mm long, to 3 mm broad; tepals more or less short-pilose on the outside, ovate or broad-ovate, 1–1.5 cm long, 0.6–1 cm broad; spur subhorizontal, 1.5–2 cm long, to 2.5–3 mm wide with a rather obtusely pointed recurved tip. July–August.

Oakwoods and shrub thickets (the densely pubescent form, var. *lasio-carpum* Rgl.) or meadows (the form with slightly developed pubescence and glabrous follicles, var. *ussuriense* Rgl.). — Far East: Uss.
Gen. distr.: Manchuria. Described from the Sungacha River valley.
Type in Leningrad.

Series 18. *Dissecta* Nevski. — Plants with a more or less dense short pubescence of simple hairs; leaves very deeply dissected (almost to base), not tapering into petiole; flowers brown with a purple tinge or blue, on declinate pedicels; spur about half as long as tepals, rarely longer; bracteoles of varying shape; follicles 3, densely pilose or glabrous.

50. *D. triste* Fisch. ex DC., Syst. nat. I (1818) 362; Ldb., Fl. Ross. I, 65; Turcz., Fl. baic.-dah. I, 76. — *D. obscurum* Stev., ex DC., l.c. (nomen). — *D. lepidum* Fisch. et Lall. in Ind. sem. Horti Petrop. IX (1842) 70, var.? — Ic.: Flora, Cab. II, tab. 54.

Perennial; stem 30–70 cm high, with a rather sparse pubescence of appressed simple hairs; leaves with long appressed-pubescent petioles, pilose above and beneath (but more strongly beneath), dissected to base or almost to base into 3 lobes, the middle lobe broad-rhombic, dissected to below the middle into 3–5 lobules, the terminal lobule with 3 segments pinnately incised into linear-lanceolate teeth, rarely entire, the lateral lobules also usually pinnately incised; lateral lobes of the leaf dissected almost to base into 2–3 rhombic lobes of the second order resembling the middle lobes of the first order; leaf blade rounded-cordate or rounded-reniform in general outline; raceme very loose, usually many-flowered; bracts linear, sometimes the lowermost dissected, shorter than the pedicels; pedicels densely covered with white flexuous simple hairs, declinate, 1.5–4 cm; bracteoles close to flower, pilose, linear-lanceolate or lanceolate or ovate, 5–7 mm long, 1.5–2.5 mm broad, rather obtusely acuminate; 158 flowers brown with a slight purple tinge; tepals with dense long white hairs on both surfaces, ovate or oblong-ovate, obtuse, 1.6–2 cm long, 0.6–0.7 cm broad; spur 1–1.3 cm long, 2.75 mm wide proximally, with an obtusely pointed, more or less recurved tip; nectaries and staminodes black-brown, follicles 1.5 cm long, with extremely dense spreading hairs. July. (Plate X, Figure 6).

Steppe slopes and forest margins turned steppe. — E. Siberia: Ang.-Say. (SE), Dau. (SW). **Gen. distr.:** Mong. (Lake Khubsugul area and north of Urga [Ulan Bator]). Described from the vicinity of Doroninsk in Dauria. Type in Leningrad; cotype in Geneva.

Section 2. *KOLOBOPETALA* Huth in Engler, Bot. Jahrbüch. XX (1895) 458, emend. — Nectaries and staminodes light-colored, usually concolor with tepals, not black-brown; limb of staminodes entire or cleft into 2 obtuse lobes, more or less white-ciliate-margined, with a proximal tuft of yellowish hairs above; flowers in blue and azure hues; petioles not broadened or scarcely broadened proximally; roots not tuberously thickened.

Series 1. *Dictyocarpa* Nevski. — Limb (lamina) of staminodes 4–6(7) mm long, 3–4(5) mm broad, oblong-ovate, deeply incised. Plants with a more or less developed pubescence of simple hairs or glabrate.

51. *D. laxiflorum* DC., Syst. nat. I (1818) 360; Ldb., Fl. Ross. I, 63; Kryl., Fl. Zap. Sib. V, 38. — *D. amoenum* Stev. ex Dc., l.c. 516.

Perennial; stem 35–75 cm high, in lower part covered with rather long reclinate hairs, in upper part glabrous to inflorescence; axis of inflorescence, pedicels, and sometimes upper part of stem almost always [sic!] densely pubescent with short curved appressed simple hairs; petioles with long white hairs at the margins; leaf blade appressed-pilose above and beneath (more strongly beneath, especially along the veins), rounded-cordate or rounded-reniform, dissected as in *D. dictyocarpum*; flowers dark blue, usually in loose few-flowered racemes, near tip of stem, sometimes also on 2 or 3 remote shortish branches; bracteoles linear-subulate or linear-filiform, appressed-pubescent, slightly removed from flower, 5–7 mm long, 0.4–0.5 mm broad; tepals with appressed short pubescence on the outside, 1.6–2 cm long, 0.8–1.2 cm broad, ovate obtuse; spur horizontal, 1.5–2 cm long, ca. 3 mm wide proximally; staminodes and nectaries azure; follicles 3, appressed, almost tomentose-pubescent, rarely glabrous. June–July.

Steppe meadows, gravelly and stony slopes. — W. Siberia: Alt., Irt. (vicinity of Omsk). Endemic. Described from Siberia. Type in Geneva.

Note. The key characters distinguishing this species from *D. dictyocarpum* are length of the spur and dimensions of flowers. The pubescence of the follicles is similar in the two species.

52. *D. dictyocarpum* DC., Syst. nat. I (1818) 360; Ldb., Fl. Ross. I, 63; Kryl., Fl. Zap. Sib. V, 1138. — *D. dictyocarpum* var. *glaberrimum* Trautv. in Bull. Soc. Nat. Mosc. XXXIII, 1 (1860) 81. — *D. ciliatum* β *dictyocarpum* Huth, Monogr. 404, pro parte.

Perennial; stem 60–100 cm high, quite glabrous throughout its length or rather sparsely covered in lower part with long distant hairs, ribbed; petioles glabrous or with long setose hairs at the margins, mainly near base of blade; the blade rounded-cordate or rounded-reniform, slightly cordate or very slightly cuneate, glabrous or with long white hairs beneath, along the veins and at the margins, palmately dissected to considerably below the middle into 5–7 rhombic or broad-rhombic lobes, the middle lobe separated at base more deeply than the 4–6 lateral lobes, these being in fact lobes of the second order, the middle lobe unequally pinnatifid, with lanceolate acuminate terminal sections; lateral lobes resembling the middle lobe; raceme simple or branched at base, dense or rather dense, with very numerous flowers; raceme axis glabrous; bracts linear, glabrous, rarely with few white hairs; pedicels slightly declinate, slender, glabrous, 1–2.5 cm; bracteoles linear-subulate, quite glabrous, very rarely with extremely few cilia, close to flower, 2–6 mm long, ca. 0.5 mm broad; tepals blue or dark blue, glabrous, ovate subobtuse, 1.2–1.6(1.8) cm long, 0.7–1.1 cm broad; spur horizontal, more or less rugose, glabrous, 1–1.2 cm long, ca. 2.75 mm wide proximally, with a rather obtusely pointed recurved tip; nectaries and staminodes azure or whitish; follicles 3, glabrous or ciliate in upper part along the sutures, reticulate, ca. 1.2 cm long. June–August. (Plate X, Figure 7).

Steppe and dry-valley meadows, rarely steppe shrub thickets. — European part: Transv., V.-Kama (S. Urals); W. Siberia: U. Tob., Irt., Alt.; Centr. Asia: Dzu.-Tarb. Endemic. Described from Siberia. Type in Geneva.

53. *D. uralense* Nevski, sp. nova in Addenda VI, p. 554. — *D. dictyocarpum* var. *canescens* Korsh., Tent. fl. Ross. Or. (1898) 18.

160 Perennial; entire plant — stem, leaves, axis of inflorescence, pedicels, and petioles — covered with a gray velutinous tomentum of extremely short (only in lower part of stem slightly longer) appressed hairs; stem 55–110 cm high, ribbed in lower half; leaves rounded-cordate or rounded-reniform, 3.5–7 cm long, 5.5–12 cm broad, dissected to considerably below the middle and almost to the base into 3 very disjointed lobes (dissection terminating 3–9 mm from base of blade), the middle lobe oblong-rhombic, dissected almost to the middle into 3 lobules, the middle lobule incised into 3 linear-lanceolate rather obtusely acuminate teeth, the middle tooth large, the lateral smaller, the lateral lobules usually bidentate, the upper tooth longer and larger; lateral lobes of the leaf blade dissected to below the middle into 2 lobes of the second order, the upper resembling the middle lobe of the first order; flowers numerous, bright blue, in a dense raceme, simple or branched in its lower part; bracteoles linear-subulate, 3.5–6 mm long, ca. 0.4–0.5 mm broad, densely appressed-pubescent, subtending the flower; tepals ovate obtuse, densely appressed-pubescent on the outside, 1–1.6 cm long, 0.5–0.9 cm broad; spur subhorizontal, rather obtusely pointed and subterminally very slightly recurved, 1.2 cm long, 2–2.5 mm wide; nectaries and staminodes azure-blue or more or less whitish; follicles 3, with a very dense, extremely short appressed pubescence.

Steppe mountain meadows and shrub thickets. — European part: S. Urals. Endemic. Described from near the village of Andreevka in the former Orenburg Province. Type in Leningrad.

54. *D. cyananthum* Nevski, sp. nova in Addenda VI, p. 554. — *D. dictyocarpum* var. *pubiflorum* Trautv. in Bull. Soc. Nat. Mosc. XXXIII, 1 (1860) 81.

Perennial; stems 75–100 cm high, glabrous throughout their length, sometimes slightly pilose at very base; petioles quite glabrous, rarely with cilia at the margins; leaf blade rounded-cordate, short-ciliate-pilose at the margin, short-pubescent along the veins beneath, glabrous above, dissected almost to the base into 5–7 broad-rhombic lobes, the middle lobe more deeply separated at base than the 4–6 lateral lobes, these being in fact lobes of the second order, the middle lobe cleft into 3–5 lobules, the middle lobule with 3 large lanceolate acuminate teeth (the middle tooth particularly large), the lateral with 1–2 unequal teeth; lateral lobes of the leaf blade of the second order resembling the middle lobe of the first order; raceme many-flowered, extremely dense, usually branched at base; pedicels short (usually ca. 1 cm), with a dense pubescence of simple, more or less crisp, appressed hairs; bracteoles linear-subulate, sometimes almost linear-lanceolate, close to flower, densely pubescent, 1.5–5 mm long, ca. 0.5–1 mm broad; flowers bright blue or azure; tepals with a dense appressed pubescence of simple hairs on the outside, ovate obtuse, 1–1.1 cm

161 long, 0.4–0.8 cm broad; spur also pubescent, horizontal or subhorizontal, 1.1–1.3 cm long, ca. 3 mm wide proximally; nectaries and staminodes blue; follicles 3, very densely covered with semiappressed simple hairs. June–August.

Steppe mountain meadows. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb. Endemic. Described from the Tentek River area. Type in Leningrad.

Series 2. *Aemulantia* Nevski. — Limb (lamina) of staminodes 4–6(7) mm long, 3–4(5) mm broad, oblong-ovate, deeply incised; inflorescence with a yellowish glandular pubescence.

55. *D. aemulans* Nevski, sp. nova in Addenda VI, p. 554.

Perennial; stems 80–100 cm high, to 8 mm thick at base, slightly ribbed, in lower part slightly violet-colored and more or less densely covered with spreading retrorse white setose hairs, in upper part glabrous and smooth almost to the inflorescence; stem right below the inflorescence, axis of inflorescence and pedicels with a very dense glandular pubescence of right-angled spreading short yellowish glandular hairs, some of these utriculately broadened at base; leaves similar to those of *D. dictyocarpum*; petioles quite glabrous (those of upper leaves) or ciliate-margined; leaf blade glabrous, rounded-reniform, truncate or very slightly cuneate, in lower leaves rarely slightly cordate, palmately dissected almost to base into 5–7 linear-rhombic lobes, the middle lobe more deeply separated than the 4–6 lateral lobes, these being in fact lobes of the second order, the middle lobe pinnatifid, the terminal lobule linear-lanceolate, usually tridentate-tipped (the teeth linear or linear-lanceolate, acuminate, the middle tooth considerably longer than the lateral, the lateral lobules recurved at base of terminal lobule, the latter cleft on each side into 3 acuminate linear toothlike segments diminishing toward base; lateral lobes of the second order resembling the middle lobe of the first order; raceme with very numerous flowers dense, branched at base; pedicels slightly spreading, 1–2 cm; bracts linear-filiform, densely glandular-pubescent, close to flower, 6–10 mm long, 0.5 mm broad; flowers dark blue; spur with a violet tinge; tepals and spur with few right-angled spreading short mostly glandular hairs on the outside; tepals ovate obtuse, ca. 1 cm long, to 0.75 cm broad; spur horizontal, 1.2–1.3 cm long, 1.5–1.75 mm wide, with a rather obtusely pointed recurved tip; nectaries and staminodes blue or azure; follicles 3, extremely densely covered with spreading glandular and yellowish hairs. July–August.

Shrub thickets on mountain slopes. — Centr. Asia: Dzu.-Tarb. Endemic. Described from the Monrakskie Mountains near the city of Zaisan. Type in Leningrad.

56. *D. altaicum* Nevski, sp. nova in Addenda VI, p. 555.

162 Perennial; stems 80–100 cm high, at base slightly violet-colored and with short, more or less appressed hairs, in middle part usually glabrous, in upper part slightly pubescent; axis of inflorescence and pedicels with very dense, short spreading hairs; petioles glabrous or scarcely pilose; leaf blade glabrous or glabrate above, short-pubescent along the veins

beneath, rounded-cordate or very slightly cuneate, palmately dissected almost to base into 5–7 rhombic lobes, the middle lobe more deeply separated at base than the 2–3 sets of second order lateral lobes, the middle lobe unequally pinnatifid, terminating in a large, broad-lanceolate, coarsely 3-toothed lobule with sharply acuminate teeth, the middle tooth linear-lanceolate, large and long, the lateral teeth triangular-lanceolate, short; the middle lobe bearing on each side lateral, usually bidentate lobules; lateral lobes of the second order resembling the middle lobe of the first order; raceme simple, few-flowered, dense or loose; pedicels slightly squarrose, 1–2 cm; bracteoles linear-filiform, 4–7 mm long, ca. 0.5 mm broad, densely glandular-pubescent, close to flower; flowers dark blue; spur with a more or less pronounced violet tinge; tepals and spur with few right-angled spreading short mostly glandular hairs on the outside; tepals ovate or elliptic-ovate, obtuse, 1.2–1.3 cm long, to 0.75 mm broad; spur horizontal, 1.5–1.9 cm long to 2.5 mm wide, with a rather obtusely pointed recurved tip; nectaries and staminodes blue; follicles 3, very densely covered with spreading more or less glandular-pilose hairs. August.

Shrub thickets on mountain slopes. — W. Siberia: Alt. Endemic. Described from the Lake Marka-kul' area. Type in Leningrad.

Series 3. *Cheilanthes* Nevski. — Limb (lamina) of staminodes (6)8–10 mm long, (5)6–8(9) mm broad, rounded-ovate, entire and apically more or less crenate-margined, rarely incised; stems not branched, raceme simple.

57. *D. cheilanthum* Fisch., ex DC., Syst. nat. I (1818) 352; Ldb., Fl. Ross. I, 60; Huth, Monogr., 466. — *D. dahuricum* Bess., Catal. pl. h. bot. Cremenec. Supplem. III (1814) 9, non Georgi. — *D. sylvaticum* Turcz., exs. a. 1832. — *D. parviflorum* Turcz. in Bull. Soc. Nat. Mosc. XV (1842) 75. — *D. middendorffii* Trautv., Fl. taim. phan. in Middend. Sib. Reise B. 1. Th. 2 Bot. (1847) 63; Huth, l.c., 470. — Ic.: Gmelin, Fl. Sib. IV, tab. 76; Bot. Reg. VI, tab. 473; Rgl., Gartenfl. XIII, tab. 253; Trautv., l.c., tab. 1.

163 Perennial; stem (15)30–95 cm high, slightly sulcate, quite glabrous and smooth throughout, sometimes with extremely few obscure short hairs confined to the very base; axis of inflorescence also glabrous and smooth; leaves grayish with an appressed short pubescence beneath, usually glabrous (rarely slightly pubescent) above, rounded-cordate or rounded-reniform, dissected to base or almost to base into 3 lobes, the middle lobe lanceolate-rhombic, dissected to the middle or deeper into 3 lobules, the middle lobule linear-lanceolate or linear, tridentate (the outer teeth short) or entire, the lateral lobules dissected into 2 unequal teeth or entire linear; lateral lobes of the blade dissected into 2–3 lobes each, the middle and upper adjacent to the middle lobe of the first order and resembling it, the outer, facing the petiole on one side, with 2 bidentate, lanceolate or entire linear lobules; uppermost cauline leaves and lower bracts usually dissected into 3 entire linear lobes; petioles long, almost completely glabrous; pedicels usually more or less short-pubescent distally above the bracteoles, smooth below them, 1–3 cm; bracteoles more or less removed from flower, linear-subulate, 2.5–5 mm long, pubescent; tepals blue, short-pubescent, ovate or

ovate-lanceolate or elliptic, obtuse, 1.5–2.2(2.5) cm long, 0.5–1.1 cm broad; spur 1–1.8 cm long, 2.5–3.5 mm wide proximally, horizontal, with an obtusely acuminate slightly recurved tip; nectaries blue, the tips of their laminae violet bluish; staminodes usually with a conspicuous violet hue, violet-blue; follicles 3, ca. 2 cm long, minutely appressed-pubescent, rarely glabrous. July. (Plate X, Figure 8).

Meadows and shrub thickets in river valleys, meadow slopes in the alpine zone, and tundra. — Arctic: Arc. Sib.; E. Siberia: Ang.-Say., Dau., Lena-Kol.; Far East: Ze.-Bu.; Centr. Asia: Dzu.-Tarb.; **Gen. distr.:** Mong. (N.). Described from the vicinity of Doroninsk in Dauria. Type in Leningrad; cotype in Geneva.

Note. There is no justification for the recognition of *D. midden-dorfii* Trautv. as an independent species; indeed, Trautvetter himself subsequently refuted it. It is simply a very low-growing, arctic, high-mountain modification of *D. cheilanthum* Fisch. With *D. brachycentrum* Ldb. the latter forms a series of species which are distinguished from *D. brachycentrum* by its glabrous, smooth stems, obtuse tepals, and possibly also by the color of the staminodes.

58. *D. brachycentrum* Ldb., Fl. Ross. I (1842) 60; Huth, Monogr. 459; Hultén, Fl. Kamtch. II, 104; Kom., Fl. Kamch. II, 120. — *D. brachycentrum* f. *riparium* et f. *alpestre* Kom., l.c. — *D. stenosepalum* Turcz. in Bull. Soc. Nat. Mosc. XXVII, 4 (1854) 278. — *D. maydellianum* Trautv. in A.H.P. VI (1879) 7. — *D. pauciflorum* Rchb. ex Schlecht. in Linnaea VI (1831) 582, nomen; Ldb., Fl. Ross. I, 61, diagn. — Russian name: zhivokost' korotkoshportsevaya [short-spurred].

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Perennial; stem 15–45(75) cm high, pubescent from base to very tip but more strongly in upper part with short appressed crisp hairs, more or less densely leafy; petioles as well as blades with a dense soft appressed pubescence, the latter almost tomentose-pubescent, especially beneath; leaf blade rounded-cordate, dissected to considerably below the middle into 3 lobes, the middle lobe rhombic, cleft to about one-third into 3 lobules, the middle lobules 3-segmented, the middle segment usually tridentate, the lateral segments toothlike, the lateral lobules unequally 3–4-toothed; lateral lobes of the leaf each dissected to below the middle into 3 lobes of the second order resembling the middle lobe of the first order; axis of inflorescence and pedicels appressed-pubescent, lower pedicels to 3–6(9) cm; flowers few, large, blue, in a loose or rather dense raceme; lower bracts leaf-shaped, the upper linear; bracteoles linear-filiform, 6–14 mm long, densely pubescent, close to or slightly removed from flower; tepals usually lanceolate, acuminate or rather obtusely acuminate, with appressed hairs on the outside, glabrous on the inside, 2–3 cm long, 0.7–0.8 cm broad; spur horizontal, 1.4–1.5 cm long, 3–3.5 mm wide proximally, with a rather obtusely pointed, more or less recurved tip; nectaries whitish or else blue near the apex; staminodes pale blue; follicles 3, 1.6–1.7 cm long, densely pubescent with semiappressed hairs. July–August.

Waterside woods, gravels and meadow lichen tundra on mountain ridges. — Arctic: An.; E. Siberia: Lena-Kol.; Far East: Kamch. Endemic. Described from Kamchatka. Type in Leningrad.

Note. Distinguished from *D. cheilanthum* by pubescence of stem and long acuminate tepals but not by pubescence of follicles since they are

usually pilose in both species, as evident from authentic specimens. *D. maydellianum* Trautv. was based on a misunderstanding as *D. brachycentrum* frequently has an apically dissected staminode limb. Varieties are dealt with by Komarov in Fl. Kamch. II, 120, 121.

Series 4. **Grandiflora** Nevski. — Limb (lamina) of staminodes 7–8 mm long and about as broad, rounded-ovate or suborbicular or scarcely bilobate, glabrous-margined, with a basal tuft of yellowish hairs above; stem more or less branched in upper part.

59. *D. grandiflorum* L., Sp., Pl. (1753) 531; C.A.M. in Ldb., Fl. Alt. II, 289; Ldb., Fl. Ross. I, 60; Turcz., Fl. baic.-dah. I, 72; Huth, Monogr., 461; Kryl., Fl. Zap. Sib. V, 1137. — *D. chinense* Fisch. ex DC., Prodr. I (1824) 53. — *D. grandiflorum* β *chinense* DC., l.c. — *D. pubiflorum* Turcz., l.c., 73, nomen. — Ic.: Gmelin, Fl. Sib. IV (1769) tab. 78; Bot. Mag. XLI (1814) t. 1686.

165 Perennial; stem erect, branched or rarely simple, 25–50 cm high, with an appressed pubescence of small simple hairs; petioles linear, pubescent as the stem; leaf blade pilose, palmately divided to base into 5 broad-ovate lobes (only the middle lobe of the first order deeply separated), the lobes more or less regularly biternately dissected into narrow-linear acuminate longish, slightly curved sections 1.25–1.75 mm broad. Flowers few, bright blue, in a loose broad raceme; lower bracts usually dissected, most often into 3 narrow-linear lobules, the upper entire, less than half as long as the pedicels, the latter 2–6.5 (10) cm, appressed-pubescent; bracteoles linear-subulate, 3–6 mm long, in upper half of pedicels; tepals pubescent on the outside, elliptic-ovate or elliptic-obovate, obtuse, 1.3–2.4 cm long, 0.7–1.1 (1.4) cm broad; spur subhorizontal, rather obtusely acuminate, slightly upcurved, 1.6–2 cm long, ca. 2.5 mm wide; nectaries with entire, more or less pale orange, rarely bluish apex; staminodes blue; follicles densely pilose, 1.5–1.6 cm long. June–August.

Stony slopes and dry meadows in river valleys. — W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau., Lena-Kol.; Far East: Okh. (S.), Uda, Ze.-Bu., Uss. (Amur area). Gen. distr.: Mong., Jap.-Ch. (NW China, Manchuria). Described from E. Siberia. Type in London.

Section 3. **DIEDROPETALIA** Huth in Engler, Bot. Jahrbüch. XX (1895) 420. — Nectaries and staminodes light-colored, usually concolor with tepals, not black-brown; limb of staminodes deeply dissected into 2 or more less acuminate white-ciliate lobes, the staminodes usually not shorter than the tepals; flowers blue, violet, and other hues; petioles usually strongly broadened and inflated at base; roots often tuberously thickened.

Series 1. **Insignia** Nevski. — Flowers few (2–4), very large, pale violet, with tepals 1.9–2.1 cm long, 1–1.3 cm broad; inflorescence umbelliform, staminodes obtusely bilobate and glabrate; roots not tuberously thickened.

60. *D.knorringianum* B. Fedtsch. in Journ. Hort. Soc. LXI (1936) 196.

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Perennial; stem 35–45 cm high, spreading-pilose below, glabrous in upper half; leaves with long more or less pilose, basally broadened petioles, concentrated in lower part of stem; leaf blade rounded-reniform, palmately dissected into 5 obovate lobes, these apically cleft into 3 elliptic-lanceolate lobules terminating in a slightly thickened mucro, the lateral lobules usually shallowly cleft; stem furcately or bifurcately branched, with 2–4 flowers on very long (5–7 cm) pedicels or one branch of stem terminating in one flower and the other in an umbel of 3 or 2 flowers; pedicels many times as long as the linear bracts, densely covered with more or less glandular spreading hairs in their upper part; bracteoles linear obtuse, pilose, ca. 4 mm long, in upper half of pedicels, usually slightly removed from one another; tepals broadly elliptic-ovate, obtuse, slightly pubescent on the outside; spur slender and long, 2.2–2.5 cm long, 2.5 mm wide, terete, more or less pubescent, usually bifurcate below and at the tip; nectaries and staminodes pale violet; follicles densely pilose. June.

Stony mountain slopes. — Centr. Asia: Pam.-Al. (E.). Endemic. Described from the Ak-bura River gorge in the Osh area. Type in Leningrad.

Series 2. *Ternata* Nevski. — Flowers few, bright violet-blue or dark blue, in a loose raceme; tepals glabrous; lamina of staminodes ovate, dissected into 2 oblong obtuse lobes, long white-barbate above; tepals densely glandular-pilose; leaves deeply dissected into incised lobes; petioles slightly broadened proximally; roots slightly thickened.

61. *D.ternatum* Huth, Monogr. (1895) p. 421, pro parte.

Perennial; stem 75–100 cm high, slightly branched above, very densely pubescent with spreading longish hairs, simple below and glandular above; petioles densely pilose; leaf blade more strongly pubescent beneath than above, suborbicular or rounded-reniform, large, dissected almost to base into 3 lobes, the middle lobe obovate or lanceolate, cuneate and biternately cleft at the apex, with short rather obtusely acuminate terminal lobules; lateral lobes of the blade dissected to below the middle into 2 lobes of the second order resembling the middle lobe of the first order, the leaf thus appearing palmatisect; upper leaves frequently dissected into 3 entire lanceolate lobes; axis of inflorescence and pedicels glabrous; bracts narrow-linear, glabrous or glabrate, 5–14 mm long, less than one-third or half as long as pedicels; bracteoles smaller, to 6–7 mm long, linear-subulate acuminate, above or near middle of pedicels, pedicels 1.5–4 cm long; tepals obtuse, 1.2–1.3 cm long, 0.6–0.7 cm broad; spur subhorizontal and straight, slightly recurved, obtuse, 1.4–1.5 cm long, 2.5–2.75 mm wide; nectaries whitish, with tip of lamina shallowly dissected and slightly bluish; staminodes bluish or whitish bluish; follicles 1.3–1.4 cm long. May–July.

Mountain slopes, in the shade of junipers, and in gorges. — Centr. Asia: Pam.-Al. (Kugitang, Zeravshan, Gissar). Endemic. Described from the Gissar Range. Type in Leningrad.

167 Series 3. *Pseudoternata* Nevski. — Flowers few, bright azure, disposed in a loose raceme, with glabrous tepals; lamina of staminodes deeply incised and long white-barbate; follicles pilose; leaves ternately divided to base, with sessile lobes; petioles slightly broadened proximally; roots not tuberously thickened.

62. *D. lipskyi* Korsh. in Bull. Acad. Imp. Sci. St. Petersburg., sér. 5, IX (1898) 403.

Perennial; stem erect, 60–75 cm high, rather slender, branched above, below the point of branching rather densely covered with shortish spreading (in lower part simple and in middle part glandular) hairs; petioles spreading-pilose; leaves small, 2–5 cm in diameter, pilose beneath, glabrate above, the lower reniform-rounded, ternately divided to base into sessile lobes, the lateral lobes bipartite almost to base, the leaf thus appearing palmatipartite; all leaf lobules of the last order trifid, with entire or incised segments, lobules of upper leaves entire, linear or lanceolate; axis of inflorescence and pedicels glabrous; bracts narrow-linear or linear, glabrous, acuminate, 2.5–5 mm long; pedicels many times as long as bracts, 1.5–4.5 cm; bracteoles glabrous, acuminate, 1.5–3 mm long, above or about the middle of pedicels, rarely slightly lower; tepals obtuse, 1.1–1.3 cm long, 0.5–0.9(1) cm broad; spur subhorizontal, straight or slightly recurved, rather obtusely pointed or obtuse, sometimes with a small gibbosity near the tip, terete, 1.4–2 cm long, 2–2.25 mm wide; nectaries pale azure, staminodes azure; follicles 1.1 cm long. June.

Stony mountain slopes. — Centr. Asia: Pam.-Al. (Darvaz, Shugnan). Endemic. Described from the Khumbau River valley (Darvaz). Type in Leningrad.

Series 4. *Longipedunculata* Nevski. — Stem with spreading branches; flowers bright violet-blue, in loose racemes, on very long pedicels; tepals glabrous; limb of staminodes with subobtuse lobes; follicles glabrous; roots more or less thickened.

63. *D. longipedunculatum* Rgl. et Schmalh. in A.H.P. V (1877) 226; Huth, Monogr., 441.

168 Perennial; stem usually ca. 50–60, rarely 30–35 cm high, rather dense pubescent with white distant hairs below and glandular-pilose hairs above; lower leaves rounded-reniform, palmately dissected into 5 obovate lobes, these apically cleft into 3–2-segmented lobules; upper leaves more deeply dissected into narrower biternately dissected or bisected lobes; leaf blade slightly pilose above, more densely pilose beneath; petioles long, more or less ciliate or pilose, broadened at base; raceme very loose and broad, with glabrous axis and pedicels; bracts entire, linear, glabrous, 4–5.5 mm long; pedicels 3–6 mm long, many times as long as bracts, spreading, arcuately ascending; bracteoles very small, linear, glabrous, slightly distant from flower; tepals elliptic-ovate or obovate, obtuse, 0.5–0.9(1) cm long, ca. 0.6–0.7 cm broad; spur almost straight, rather slightly recurved, obtusely pointed, 1–1.2(1.4) cm long, 2 mm wide; nectaries yellowish and blue-tipped; staminodes blue, with a suborbicular limb. May–June.

Dry stony slopes in foothills and in the lower mountain zone. — Centr. Asia: T. Sh. (W.), Pam.-Al. Endemic. Described from the Karatau Mountains on the route from the city of Turkestan to Chimkent. Type in Leningrad.

Series 5. *Saniculifolia* Nevski. — Stem more or less branched above, the leaves concentrated in its lower part and dissected to base into sessile, shallowly incised lobes; flowers pale lilac or azure, in loose racemes; tepals glabrous; lamina of staminodes obtusely bilobate; follicles glabrous; roots thickened.

64. *D. semiclavatum* Nevski, sp. nova in Addenda VI, p. 555.

Perennial; stem 55–75 cm high, in its lower half with dense appressed, more or less spreading glandular hairs, slightly branched, with long virgate branches; petioles broadened proximally; leaf blade semiorbicular, glabrate, dissected to base into 3 sessile lobes, the middle lobe obovate, cuneately tapering, shallowly cleft at the apex into 3–5 broad rounded obtuse lobules; lateral lobes of the leaf blade broader than middle lobe, dissected to the middle into 2 broad-cuneate lobes of the second order, these cleft to about one-fourth of their length into oblong sections terminating in 2–3 obtuse teeth; raceme very loose, long, few-flowered; pedicels not longer than 1.5–1.7 cm, glabrous; bracts narrow linear-lanceolate, glabrous, small, considerably shorter than pedicels; bracteoles ca. 1.5–2 mm long, subulate-linear, slightly below flower; tepals pale lilac or pale bluish lilac, with very dark veins, obtuse, 0.95–1 cm long, 0.45 cm broad; spur obliquely ascending or erect or suberect, obtuse, unilaterally inflated (with a gibbosity) near the tip, 1–1.2 cm long, ca. 2.75 mm broad proximally; nectaries whitish; staminodes pale lilac, the lamina rounded-ovate, apically dissected into 2 obtuse lobes, glabrate; staminodes, including claw, 0.9–0.95 cm long; follicles 0.8 cm long. June–July.

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Stony mountain slopes. — Centr. Asia: Pam.-Al. (NW). Endemic. Described from the Sangardak area. Type in Leningrad.

Note. Extremely close to the Iranian *D. saniculaefolium*, from which it can be distinguished by the color of flowers (azure in *D. saniculaefolium*), longer spur, shorter pedicels, less branched stems, and, in particular, the glabrate staminodes.

Series 6. *Lanceolatifolia* Nevski. — Inflorescence a rather loose, simple raceme; flowers blue; tepals pubescent on the outside; lamina of staminodes very shallowly incised; follicles glandular-pubescent. Cauline leaves lanceolate, cuneate, more or less incised at the apex; petioles strongly broadened at base; roots almost tuberously thickened.

65. *D. batalinii* Huth in Engler, Bot. Jahrbüch. XX (1895) 432.

Perennial; stem erect, simple or scarcely branched, 25–50(70) cm high, with a dense short appressed pubescence; radical leaves and most cauline leaves dying off before anthesis; blade of radical leaves rounded-obovate, cleft into 2 obtuse lobes; cauline leaves cuneate-lanceolate, cleft almost

to the middle into 3 linear (1.75–4 mm broad) rather obtusely acuminate lobes, these sometimes apically bilobulate, thickish, slightly pilose; bracts linear (very rarely the lower bracts trilobate), pilose, the lower 1.5–2 cm long and generally longer than the pedicels, the upper slightly shorter; pedicels pubescent; bracteoles below flower, linear-lanceolate, small, pilose; tepals obtuse, 0.8–1 cm long, the lower lateral-ovate, 3.75–5 mm broad, the upper lateral-broad-ovate, 6–7.25 mm broad; spur subhorizontal, slightly recurved, rather obtusely acuminate, 1.3–1.7 cm long, ca. 3 mm wide proximally; nectaries slightly blue with a whitish lamina; staminodes blue, the lamina ovate, very shallowly dissected at the apex, slightly white-pilose above, proximally tapering into a claw, the latter slightly longer than the lamina; staminodes 9–10 mm long; follicles ca. 1 cm long. (June) July–August.

Gravelly mountain slopes of steppes.— Centr. Asia: Pam.-Al., T. Sh. (SW). Endemic. Described from the Garm area. Type in Leningrad.

Series 7. *Bucharica* Nevski.— Inflorescence a loose or rather loose raceme; flowers pale-colored, whitish lilac-azure and grayish lilac-azure, the tepals glabrous or pubescent on the outside; blade of staminodes deeply laciniate, with acuminate lobes, together with claw longer than the tepals; follicles glabrous; leaf blade ternately parted, the lobes petiolar, strongly dissected into narrow-linear sections; petioles strongly broadened, proximally inflated to form a kind of reduced sheath deeply enveloping the stem; roots tuberously thickened.

66. *D. karategini* Korsh. in Bull. Acad. Sc. Pétersb. 5 sér., IX (1898) 402.

Perennial; stem 80–150 cm high, erect, strong, with appressed minute hairs below and a yellowish glandular pubescence above, glabrous in its uppermost part, simple or slightly branched; leaves green, with scattered hairs, or glabrate, lower leaves long-petioled; leaf blade ternately parted, with divaricate petiolar lobes; lateral lobes divided to base into 2 lobes of the second order on shorter petioles and, like the middle lobe, biternately dissected into long narrow-linear (1.5–3 mm broad) terminal sections; flowers numerous in a very long (to 70 cm long) rather loose raceme; bracts linear with a lanceolate base, the lower longer than the upper usually as long as the pedicels, pilose; pedicels short, to 1.5 cm, slightly pilose; bracteoles subopposite, pilose, linear, small (to 5–6 mm long), in middle part of pedicels; tepals oblong-obovate, obtuse, semiappressed-pubescent on the outside, grayish lilac-azure or whitish lilac-azure, with darkish veins, white-scarious-margined, 0.9–1.2 cm long, 0.4–0.45 cm broad; spur erect or obliquely ascending, subobtuse, pubescent, almost straight, 1.2–1.4 cm long, 2.5 mm wide proximally; nectaries whitish, apex acutely laciniate; staminodes white, including claw 1.4 cm long, the lamina long-barbate. July.

Stony mountain meadows.— Centr. Asia: Pam.-Al. (Karategin). Endemic. Described from the vicinity of Dumburach on the Muk-su River. Type in Leningrad.



PLATE XI. *Delphinium semibarbatum* Bienert: a) staminode, b) follicles, c) seeds (according to Acheson); 2 - *D. biternatum* Huth, a) flower, b) follicles; 3 - *D. freynii* Conrath, leaves.

67. *D. bucharicum* M. Pop. in "Pochvennyye ekspeditsii v basseine rek Syr-Dar'i i Amu-Dar'i" [Soil Expeditions in the Basin of the Syr Darya and Amu Darya Rivers], II (1916) 49. — Ic.: 1.c., tab. 5.

173 Perennial; stem 30–40 cm high, erect, circular in cross section, with a short pubescence below, glabrous above; leaves long-petioled, the leaf blade dissected to base into 3 short-petioled lobes, these many times dissected into narrow-linear, acute, slightly pubescent lobules; raceme simple, loose, narrow; pedicels shorter than flowers; bracts with membranous ciliate margins, linear-lanceolate acuminate, half as long as pedicels; bracteoles small, below middle of pedicels; flowers pale-colored, whitish azure; tepals glabrous, pale whitish azure, veins colored more intensely azure, shorter than the spur; spur directed upward, with a small gibbosity near the apex; nectaries very slightly dissected at the apex, azure-white; staminodes whitish, lamina split into 2 barbate lobes. May.

Mountain slopes. — Centr. Asia: Pam.-Al. Endemic. Described from mountains west of Bishkent (Kabadian area); not yet known from other localities. Type in Tashkent.

Note. M. G. Popov, in supplementary corrections to his work, decided to refute his species and to identify it with *D. leiocarpum* Huth. However, the latter species is extremely doubtful, being presumably a mixture of gymnocarpous forms of very different species belonging to the *Delphinia hybrida* auct. group. Judging by the diagnosis and illustration, *D. bucharicum* may not be identified with any of the species known from Central Asia.

68. *D. inopinatum* Nevski, sp. nova in Addenda VI, p. 556.

Perennial; stem 75–85 cm high, simple, with a dense glandular pubescence of golden yellowish hairs from base almost to inflorescence; leaves with long densely pubescent petioles; blade also densely pubescent, ternately dissected, with divaricate petiolulate lobes; lateral lobes parted into 2 lobes of the second order with shorter petiolules and, like the middle lobe, 2–3-ternately dissected into narrow-linear longish and rather obtusely acuminate sections (1.25–2(2.5) mm broad); flowers in a long (25–35 cm), rather dense raceme, the axis covered with scattered hairs; bracts very small (2–5 mm long), considerably shorter than pedicels, linear, glabrous or slightly ciliate; pedicels short, to 1.7 cm, glabrous; bracteoles extremely small, linear-subulate, in distal half of pedicels, slightly removed, glabrous or with few cilia; flowers grayish lilac-azure, pale; tepals oblong-obovate, obtuse, 0.8–0.9 cm long, 0.35–0.4 cm broad, glabrous, with more or less broad white scarious margins; spur erect or obliquely ascending, straight or almost straight, glabrous, lilac-colored, 1–1.1 cm long, 2–2.5 mm wide; nectaries whitish; staminodes white, with claw 1.1 cm long, lamina oblong, long white-barbate, dissected into linear-oblong lobes 1.25 mm broad, outer margin of lobes obtusely crenate; follicles 1.2–1.5 cm long. May.

Gravelly slopes. — Centr. Asia: Kyz. K. Endemic. Described from the Aktau Mountains in the Kara-Kalpak part of the Kyzyl-Kum Desert. Type in Leningrad.

174 Note. This plant is evidently very close to *D. bucharicum* M. Pop., described from the southwestern Pamir-Alai area. However, judging by the diagnosis and the illustration, the present species is distinguished from it by its strongly developed pubescence and denser, many-flowered racemes.

Series 8. *Cyphoplectra* Nevski. — Inflorescence a very loose, few-flowered raceme; flowers blue or azure, the tepals more or less pubescent and sometimes glandular-pubescent on the outside; lamina of staminodes deeply lacinate, with more or less acuminate lobes, together with claw slightly shorter than tepals; follicles densely pilose; blade of cauline leaves ternately parted, with sessile lobes, the lateral lobes dissected almost to base into 2 lobes of the second order (the leaf appearing to be palmatisect); petioles broadened proximally; roots tuberously thickened.

69. *D.turkmenum* Lipsky in A.H.P. XVIII (1901) 2. — *D.hybridum* var. *pilosulum* Trautv. in A.H.P. IX (1884) 437; O.Kuntze in A.H.P. X (1887) 144. — *D.pilosulum* B.Fedtsch., Fl. Tian-schan. occid. I (1904) 98; Consp. Fl. Turk. I (1906) 21. — Exs.: Sintenis, It. transcasp.-pers. 1900-1901, No.1672.

Perennial; stem (25)50-75 cm high, with long white recurved hairs at base, these hairs often scattered throughout the length but few; petioles ciliate-pilose, in lower leaves the hairs also passing onto underside of the blade; blade of radical leaves suborbicular, palmately dissected almost to base into 5 obovate lobes, these cuneately tapering to base, 1-2-ternately cleft into obtuse (rounded) lobules; blade of cauline leaves pseudopalmately dissected to base into 5 lobes, these deeply 2-3-ternately dissected into narrow-linear subobtusely sections, 1-2 mm broad; inflorescence axis glabrate; pedicels, especially in their lower part, densely glandular-pubescent; bracts broad-linear, usually less than half as long as pedicels, glandular-pubescent; bracteoles very small, close to base of flower, also glandular-pubescent; tepals blue, glandular-pubescent on the outside mainly at base, broad-obovate, 1.25-1.5 cm long, 0.6-0.8 cm broad, obtuse; spur slightly inclined upward or subhorizontal, very slightly curved, obtuse, terete, 1.5-1.7(2) cm long, ca. 3 mm wide; nectaries yellowish-whitish with a slight lilac tinge; staminodes lilac-bluish, 1.1-1.2 cm long; follicles densely glandular-pubescent. May-June.

Gravelly mountain slopes. — Centr. Asia: Mtn. Turkmen. Endemic. Described from the vicinity of Kizyl-Arvat. Type in Leningrad.

Series 9. *Laxiuscula* Nevski. — Inflorescence a very loose few-flowered raceme; flowers dark violet or whitish azure-lilac, the tepals with an appressed pubescence of simple hairs on the outside; lamina of staminodes deeply split into 2 acuminate, barbate divergent lobes, with claw not shorter than tepals; follicles appressed-pilose or glabrous; leaf blade repeatedly ternately dissected into narrow-linear sections; petioles very strongly broadened proximally; roots tuberously thickened.

70. *D.laxiusculum* (Boiss.) Rouy in Fl. France I (1893) 143, in adnot. — *D.hybridum* var. *laxiusculum* Boiss., Fl. Or. I (1867) 89. — *D.hybridum* ssp. *laxiusculum* N.Busch in Fl. cauc.-crit. III, 3 (1903) 56. — *D.hybridum* var. *floribus saturate violaceis* Hohen., Enum. Talysch. (1838) 148. — *D.latiusculum* Grossh., Fl. Cauc. II, 97 (ut videtur lapsus calami). — *D.hybridum* γ *gracillimum* Ldb., Fl. Ross I (1842) 61. — *D.hybridum* var. *hirtula* Trautv. in

A.H.P. I, 1 (1878) 21. — *D. cyphoplectrum* β *stenophyllum* Boiss., Fl. Or. I (1867) 91; Huth Monogr., 428; N. Busch, Fl. cauc. crit. III, 3, 48. — Exs.: Herb. Kronenburgianum, No. 138.

Perennial; stem (15)20–50(55) cm high, with a dense very short pubescence of appressed simple hairs, very rarely glandular-pubescent in upper part, simple or slightly branched; leaf blade pseudopalmately dissected to base into 3–5 lobes, these deeply 1–2 ternately dissected into narrow-linear sections 0.5–1.5(3) mm broad, slightly pubescent; bracts broad-linear, appressed-pubescent, shorter than the pubescent pedicels; bracteoles very small, 1.5–2.5 mm long, linear-subulate, close to or very slightly above base of pedicels; tepals dark-violet, ovate, usually rather obtusely acuminate, (1)1.1–1.3(1.4) cm long, (0.35)0.4–0.5 cm broad; nectaries more or less violet colored; staminodes 1.1–1.2 cm long, dark violet or paler; spur obliquely ascending, obtuse or rather obtusely pointed, sometimes with a small gibbosity near the tip, 1.1–1.2 cm long, 2.75–3 mm wide proximally; flowers sometimes dingy purple-violet; follicles appressed-pubescent or glabrous. June–July.

Shrub thickets on dry mountain slopes. — Caucasus: E. and S. Transc., Tal. **Gen. distr.:** Iran (near the USSR border). Described from the vicinity of Elizavetpol' [Kirovabad]. Type in Geneva.

Note. This species is very close to *D. cyphoplectrum* Boiss., from which it is distinguished merely by the color of tepals (azure in *D. cyphoplectrum*). It is incorrect to separate *D. cyphoplectrum* from related species on the basis of length and shape of the spur, as Bush and Grossheim have done. The shape of the spur varies also in *D. cyphoplectrum* and the subterminal gibbosity of the spur is often obscure. The latter species is not encountered in the Caucasus.

71. *D. quercetorum* Boiss. et Hausskn. in Boiss., Fl. Or. Suppl. (1888) 20. — *D. hybridum* ssp. *laxiusculum* var. *pallidiflora* N. Busch in Fl. cauc.-crit. III, 3 (1903) 57; Grossh., Fl. cauc. II, 97.

176 Perennial; stem glandular-pubescent in middle part or below inflorescence, without glandular pubescence at base, 40–75(115) cm high, taller and thicker than in *D. laxiusculum*, usually simple; leaves as in *D. laxiusculum* but with terminal linear sections broader (to 2.75–3 mm), more or less pilose; bracts narrow-linear, shorter than pedicels; bracts and pedicels appressed-pubescent, bracteoles disposed at very base of pedicels, linear-subulate, to 3.5(5) mm long; tepals whitish or whitish lilac with azure-violet veins, oblong-ovate, obtuse, 1–1.2 cm long, 0.35–0.45 cm broad; spur straight and subhorizontal, rather obtusely pointed or obtuse, 1.1–1.3 cm long, sometimes with a gibbosity near the tip; nectaries whitish, with more or less broad azure-violet stripes only near the apex; staminodes also whitish; follicles glabrous, rarely appressed-pubescent. May–July.

Stony mountain slopes. — Caucasus: Tal., S. Transc. **Gen. distr.:** Arm.-Kurd. Described from Iranian Kurdistan. Type in Geneva.

Series 10. *Punicea* Nevski. — Inflorescence a very dense raceme; flowers blackish purple, the tepals appressed-pubescent on the outside; lamina of staminodes deeply dissected longitudinally into straight lobes covered

with long white hairs; tepals appressed-pubescent, very rarely glabrous; leaf blade many times ternately dissected into linear sections (1.25)2–2.5 mm broad; petioles very strongly broadened at base, forming a kind of abbreviated sheath half-clasping the stem; roots tuberously thickened.

72. *D. puniceum* Pallas, Reise III, Anhang (1776) 736; M.B., Fl. taur.-cauc. II, 13; III, 371; Huth, Monogr., 433, pro parte. — *D. hybridum* β *puniceum* Claus, Ind. in Göbel It. II (1837) 248; Boiss., Fl. Or. I, 89; Shmal'g., Fl. I, 29. — *D. hybridum* ssp. *puniceum* N. Busch in Fl. cauc. crit. III, 3 (1903) 55, p. pte. — Ic.: Knowles et Westcott, Flora Cab. I (1837) t. 7 (non v.). — Exs.: HFR No. 851.

Perennial; stem 30–80 cm high, simple, densely covered with simple short appressed hairs; petioles of lower leaves to 9–16 cm long; leaf blade appressed-short-pilose on both surfaces (to a greater degree beneath); raceme 10–30 cm long, 2.5–3 cm broad, very dense above, more or less interrupted below, with remote lower flowers; bracts linear, less than half as long as pedicels, appressed-pilose; bracteoles lower than or near middle of pedicels, linear-subulate, 3–3.5 mm long, pilose; tepals elongate-obovate, ca. 1 cm long, 3 mm broad, obtuse, blackish purple on the inside, a similar color on the outside but grayish owing to dense pubescence; lamina of upper tepal small; spur obliquely ascending, straight, obtuse, brown-purple, 1.2 cm long, 2.25–3 mm wide proximally; nectaries blackish purple at apex, staminodes of the same color. June–July.

Steppes. — European part: L.V., L. Don ([former] Sal'sk District); Caucasus: Cisc.; Centr. Asia: Ar.-Casp. (Aleksandrovsk). Endemic. Described from the vicinity of Chapchachi (Lower Volga). Type in Berlin; cotype in Leningrad.

Note. Although in Flora Cauc. crit., (l.c.) N.A. Bush also cited *D. puniceum* Pall. (as *D. hybridum* ssp. *puniceum*) for E. Transc. (Dzegam in the [former] Elizavetpol' Province, Lipsky's collection; Mugan Steppe, Radde's collection), I would refer the specimens mentioned by him to *D. laxiusculum*, because the color of their flowers contains a conspicuous violet tinge, and the type of inflorescence is close to that of *D. laxiusculum*.

Series 11. *Fissa* Nevski. — Inflorescence a very dense raceme; flowers lilac, the tepals obovate obtuse, appressed-or spreading-pubescent or glabrous on the outside; lamina of staminodes deeply dissected longitudinally into straight lobes covered with long white hairs; tepals appressed-pilose or glabrous; leaf blade repeatedly ternately dissected into linear sections 1–4 mm broad; petioles very strongly broadened proximally, forming a kind of abbreviated sheath half-clasping the stem; roots tuberously thickened.

73. *D. pallasii* Nevski, sp. nova in Addenda VI, p. 556. — *D. tauricum* Pallas., Ind. taur. in Neueste Nordische Beiträge III (1796) 432 nomen nudum. — *D. hybridum* M.B., Fl. taur.-cauc. II (1808) 13 pro parte. — *D. hybridum* α β β Ldb., Fl. Ross. I (1842) 61. — *D. rossicum* Rouy, Fl. Fr. I (1893) 134, in adn., pro parte.

Perennial; stem simple or scarcely branched, 35–115 cm high, with a dense short glandular pubescence in upper half and simple hairs below (very rarely stem with simple hairs only); petioles of lower leaves to 10–20 cm long; leaf blade pseudopalmately dissected almost to base into 5 lobes, these biternately dissected into linear sections; flowers in a dense simple raceme, more distant below, 12–30 cm long; bracts linear (only the lowermost parted into 2–3 lobules, half as long as pedicels or slightly longer; bracts and pedicels densely pilose; bracteoles linear-subulate, 3–5 mm long, close to flower or on upper fourth of pedicel, also pilose; tepals obtuse, 1–1.3 cm long, 1.5–0.65 [sic] cm broad, densely appressed-pubescent distally; spur obliquely ascending or subhorizontal, slightly curved and rather obtusely pointed, 1.65–2 cm long, 3–4 cm wide proximally; nectaries and staminodes lilac, rarely more or less whitish; follicles with very short appressed hairs. June–August.

Steppe clearings and stony slopes in mountain forests. — European part: Crim.; Caucasus: W. Transc. Endemic. Described from the vicinity of Yalta. Type in Leningrad.

178 Note. Extremely close to the Hungarian and Balkan *D. fissum* W. et K., but distinguished by the appressed (and not spreading), shorter pubescence on the outside of the tepals. *D. hybridum* Steph. = *D. schmalhauseni* Alb. differs sharply in color of flowers and shape of tepals. Attention has been given to the difference between the Crimean plant and the Caucasian "*D. hybridum*" by M. Bieberstein (Fl. taur.-cauc. III (1819) 370), but this author did not consider the color of the flowers.

*74. *D. leiocarpum* Huth in Bull. l'Herb. Boiss. I (1893) 334, pro min. parte.

Perennial; stem tall, simple or scarcely branched, 50–120 cm high, with a dense short glandular pubescence in upper half and covered with a down of simple hairs below; petioles of lower leaves to 15 cm or more long; leaves slightly pilose or glabrate beneath, the leaf blade pseudopalmately dissected to base into 5 lobes, these deeply 2–3-ternately dissected into linear sections 2–5(7) mm broad; flowers lilac, in a dense simple raceme; bracts and bracteoles glabrous, the bracts narrow-linear, shorter than or as long as the glabrous pedicels, the bracteoles linear-subulate, small, slightly above middle of pedicels; tepals of same size and color as in *D. pallassii* but quite glabrous or glabrate on the outside; spur almost straight rather obtusely pointed, 1.5–1.7 cm long; nectaries and staminodes concolor with tepals but paler or more or less whitish; follicles glabrous. June–July.

Steppe slopes. — European part: known from Bessarabia, and possibly encountered in the SW Ukraine. Gen. distr.: Bal.-As. Min. (W.), Centr. Eur. (S.). Described from SE Europe.

75. *D. albomarginatum* Simonova in Opred. rast. okr. Tashkenta II (1924) 123–124.

Perennial; lower leaves with long petioles strongly broadened at base into a long slightly inflated sheath, persistent until time of withering when the leaf blade is shed; leaf blade ternately parted, the lobes with long divaricate petiolules and irregularly bipalmately or pinnately parted into narrow-linear lobules; upper leaves less divided; stem 80–150 cm high,

branched and glabrous above and with a whitish down of short retrorse hairs below; flowers in dense racemes; pedicels half as long as flowers; lower bracts overtopping the flowers, the upper narrow-linear, as long as or shorter than the flowers; bracteoles at about middle of pedicels or lower, short; flowers numerous, dark violet-blue; tepals 9–10 mm long, glabrous; spur almost 1.5 times as long as tepals, straight, glabrous, obtuse; nectaries with a white quasi-coriaceous border, apically incised; staminodes ciliate; follicles glabrous. June–July.

179 Centr. Asia: T. Sh. (W.). Endemic. Described from Khumsan in the Ugamskii Range. Type in Tashkent.

Series 12. *Hybrida* Nevski. — Inflorescence a very dense raceme; flowers bright azure-blue, the tepals ovate, slightly attenuate, rather obtusely acuminate, appressed-pubescent on the outside; follicles appressed-pilose or glabrous; leaf blade repeatedly ternately dissected into linear sections; petioles very strongly broadened proximally, forming a kind of abbreviated sheath half-clasping the stem; roots tuberously thickened.

76. *D. schmalhauseni* Alb., Descript. d. novell. espéc. d. pl. tr. en Abkhasie, in Tr. Odessk. Obshch. Sadov. (1891) (n.v.); Huth, Monogr., 441. — *D. hybridum* ssp. *schmalhauseni* Busch in Fl. cauc. crit. III 3 (1903) 53. — *D. hybridum* ssp. *genuinum* Busch, l.c., 50, p.pte. — *D. hybridum* Stephan ex Willd., Sp. pl. II (1799) 1229 (v. sp. auth. in herb. Steph.), non *D. hybridum* L. in Amoën. Acad. III (1764) 37. — *D. rossicum* Rouy (s. str.) in Fl. France, I (1893) 134, in adn. — *D. hybridum* α *genuinum* Boiss., Fl. Or. I (1867) 89, p.pte. — *D. hybridum* α , a, $\alpha\alpha$ Ldb., Fl. Ross. I (1842) 61.

Perennial; stem to 125 cm high, slightly branched or simple, glandular-pubescent in upper half and with only simple short appressed hairs below, rarely entire stem with simple pubescence; leaves pseudopalmately dissected to base into 5–7 lobes, these deeply dissected into numerous linear sections, more or less pilose on both surfaces; flowers in a simple or branched raceme to 30–33 cm long; lower bracts entire, rarely parted into few lobules but then only slightly overtopping the flowers, the upper narrow-linear, entire; all bracts pilose; bracteoles linear-subulate, pilose, confined to upper fourth of the pubescent pedicels; tepals 1.3–1.5 cm long, 0.45–0.6 cm broad, with short appressed pubescence on the outside; spur obliquely ascending, subterminally recurved, rather obtusely pointed or else acuminate, 1.3–1.8 cm long, ca. 3.5–4 mm wide proximally; nectaries and staminodes concolor with tepals. July–August.

Shrub thickets and forest margins in the middle mountain zone; rarely cultivated fields. — European part: L. Don; Caucasus: Cisc., Dag., W. and E. Transc. (W.). Endemic. Described from Abkhazia. Type in Tbilisi.

77. *D. freynii* Conrath in Bull. Herb. Boiss. III (1895) 36. — *D. somcheticum* Conr. et Freyn, l.c., 37. — *D. dasystachyum* N. Busch in Fl. Cauc. crit. III, 3 (1903) 58, non Boiss. et Bal. — Exs.: Herb. Kronenburgianum, No. 137.

Perennial; stem erect, simple, 30–95 cm high, the upper internodes glandular-pubescent, the lower glabrous or with a slight pubescence of

180 appressed short simple hairs; petioles of lower leaves to 10 cm; leaf blade pseudopalmately dissected to base into 5–7 lobes, these tapering into short petiolules and deeply 3–4-ternately dissected into narrow-linear (1–2.5 mm broad) sections, pubescent on both surfaces; flowers blue, darker than in *D. schmalhauseni*, in a simple dense raceme to 37 cm long; lower bracts resembling leaves but smaller, repeatedly and deeply parted into narrow-linear lobules, considerably overtopping the flowers and imparting to the inflorescence a slightly curly shape in its lower half; upper bracts entire; bracteoles linear-subulate, small, confined to upper fourth of the appressed-pubescent pedicels, pilose; tepals 0.95–1.3(1.5) cm long, 3–5 mm broad, short-pubescent on the outside; spur obliquely ascending, rather obtusely pointed or anteriorly acuminate, 1.3–1.5(2) cm long; nectaries and staminodes almost concolor with tepals; follicles glabrous, very rarely appressed-pilose. July–August. (Plate XI, Figure 3).

Forest margins, shrub thickets in the middle mountain zone, and rarely cultivated fields. — Caucasus: E. and S. Transc. Gen. distr.: will probably be found in Arm.-Kurd. Described from Lok in Somkhetiya.* Type in Prague.

Note. This species is not sharply demarcated from *D. schmalhauseni*, but is distinguished from it by its multipartite and strongly developed lower bracts and darker flowers. It was mistaken by Huth and by N.A. Busch for *D. dasystachyum*; even though it is completely incomprehensible how this extremely distinctive species could be confused with the Caucasian plant.

Series 13. *Ochroleuca* Nevski. — Inflorescence a very dense raceme; flowers pale yellow (nectaries and staminodes sometimes blue), the tepals pubescent or glabrous on the outside; follicles pubescent or glabrous, reticulate-nerved; leaf blade deeply pseudopalmately dissected into lobes, these repeatedly ternately dissected into narrow-linear sections; petioles very strongly broadened proximally, forming a kind of abbreviated sheath half-clasping the stem; roots tuberously thickened.

78. *D. szovitsianum* Boiss., Fl. Or. I (1867) 89; Huth, Monogr. 438, p. pte. — *D. dasystachyum* ssp. *szovitsianum* N. Busch in Fl. cauc. crit. III, 3 (1903) 58. — *D. hybridum* var. *szovitsiana* Trautv. in A.H.P. II, 2 (1873) 493. — Ic.: Belgique hortic. (1872) tab. III.

181 Perennial; stem 30–90 cm high, simple, rarely slightly branched, glabrous below, with very small appressed hairs above; leaf blade pseudopalmately dissected to base into 5 lobes, these deeply triternately dissected into narrow-linear sections 0.75–2.5 mm broad, pubescent on both surfaces; flowers in a very dense cylindric raceme 6.5–20 cm long, 1.75–2.75 cm across; axis of inflorescence densely spreading-pilose, with glossy white long hairs, (becoming more or less yellow with age), rarely glabrous; lower bracts 1–2-ternately dissected into narrow-linear lobules overtopping the flowers, the upper narrow-linear entire, longer than the pedicels; bracteoles distributed slightly above or below middle of the very short (5–6(9) mm long) pedicels, the latter with long spreading hairs, rarely glabrous, the bracteoles filiform-linear, usually 7–8 mm long, with long hairs or glabrous;

* [Somkheti, an ancient region in Georgia.]

tepals sulfur yellow, very densely covered on the outside with long yellowish hairs, rarely glabrous, oblong-ovate, obtuse, 6–9.5 mm long, 2.5–4 mm broad; spur ascending, sometimes slightly curved near the rather obtusely pointed tip, (0.8)1–1.5 cm long; nectaries and staminodes blue; follicles with dense spreading hairs. July–August.

Shrub thickets and forest margins in the middle mountain zone. – Caucasus: Tal., S. Transc. **Gen. distr.:** Iran. Described from the vicinity of Nakhichevan. Type in Geneva; cotype in Leningrad.

79. *D. ochroleucum* Stev., ex DC., Syst. nat. I (1818) 353; M. B., Fl. taur.-cauc. III, 371; Hugh, Monogr., 432, pro min. parte. – *D. albiflorum* DC., l. c., 353. – *D. hybridum* var. *albiflorum* C. Koch in Linnaea XV, 247. – *D. hybridum* var. *floribus ochroleucis* M. B., Fl. taur.-cauc. II (1808) 13. – *D. hybridum* var. *ochroleucum* Boiss., Fl. Or. I (1867) 89. – *D. hybridum* ssp. *ochroleucum* N. Busch in Fl. Cauc. crit. III, 3 (1903) 54. – Ic.: Deless., Ic. Sel. I (1820) tab. 58. – Exs.: Pl. orient. exs. No. 37.

Perennial; stem simple, 30–75 cm high, glabrous below, glandular-pubescent or covered with simple appressed hairs above; leaves as in *D. schmalhauseni*, slightly pilose; flowers pale yellow or whitish yellow, nectaries and staminodes usually straw-yellow, rarely slightly azure. Raceme rather dense or rather loose, to 30 cm long, conspicuously attenuate toward apex; bracts entire (the lowermost very rarely parted into lobes), linear, slightly broadened at base, with more or less prominent white membranous margins; pedicels 7–9 mm; bracteoles in upper fourth of pedicels, linear or linear-lanceolate, 4–6(9) mm long, membranous; bracts, bracteoles, and pedicels glabrous, bracteoles and pedicels rarely squarrose-pilose; tepals oblong-obovate, obtuse, 1–1.1(1.3) cm long, 3.5–4.5(5.5) mm broad, quite glabrous on the outside or rarely densely long-pilose; spur 1.3–1.6 cm long, obliquely ascending or subhorizontal; follicles glabrous (very rarely pubescent). June–July.

Dry slopes in the middle mountain zone and cultivated fields. – Caucasus: Dag., E. and S. Transc. **Gen. distr.:** Arm.-Kurd. Described from Georgia. Type in Helsinki; cotypes in Geneva and Leningrad.

80. *D. biternatum* Huth in Engler. Bot. Jahrbüch. XX (1895) 422. – *D. ochroleucum* Huth, l. c., 432, pro parte. – *D. floribundum* Freyn et Sint. exs. (Sintenis, It. transcasp. pers. 1900–1901 No. 850).

Perennial; stem 45–100 cm high, rather thick, hollow, pubescent with small appressed hairs; leaf blade pseudopalmately divided to base, with 5 petiolulate lobes (the petiolules of each pair of lateral lobes basally united into a short common petiolule), the lobes ternately dissected into long linear rather obtusely acuminate sections (2.5)3–5.5 mm broad, glabrous or slightly pilose; inflorescence a simple or basally branched many-flowered raceme, to 35 cm long, ca. 3–3.5 cm broad; bracts linear or linear-lanceolate, slightly shorter than or as long as pedicels, obtuse or rather obtusely acuminate; bracteoles small (usually 3 mm long), linear-subulate, above middle of pedicels; pedicels from base to flower more or less spreading-pubescent on the outside and glandularly pubescent, with simple appressed short hairs below the bracteoles; flowers pale yellow; tepals densely

short-pubescent on the outside, obovate, obtuse, 10–12 mm long, 5.5–8 mm broad; spur obliquely reflexed or subhorizontal, terete rather obtusely pointed, subterminally and usually slightly recurved, 1.5–1.8 cm long, ca. 2.75–3 mm wide; nectaries pale yellow, staminodes brighter yellow; follicles to 1.5 cm long, pilose, rarely glabrate, with a sharply pronounced network of veins, the medium-length oblique veins almost as sharply pronounced as the long longitudinal ones. (June) July–August. (Plate XI, Figure 2).

Stony mountain and steppe slopes; shrub thickets. — Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al., Mtn. Turkm. Gen. distr.: Dzu.-Kash. Described from the Sengulak Mountains. Paratype in Leningrad.

Series 14. *Semibarbata* Nevski. — Inflorescence a rather dense raceme; flowers bright yellow, the tepals glabrous on the outside; pedicels 0.8–1.5 cm, glabrous up to bracteoles, above bracteoles with a yellowish beard of hairs on one side, glabrous on the side adverse to the inflorescence, with 3 defined longitudinal ribs and obscure transverse veins; leaves repeatedly ternately dissected into narrow-linear sections. Petioles broadened proximally; roots tuberously thickened.

81. *D. semibarbatum* Bienert ex Boiss., Fl. Or. I (1867) 92; Lipsky, Contrib. ad Fl. Med. II (1904) 14. — *D. hybridum* & *sulphureum* Rgl. in A.H.P. V (1877) 226. — *D. Zalil Aitch. et Hemsl.* in Trans. Linn. Soc. 2 ser., III (1888–1894) 30; Huth, Monogr., 443. — *D. biternatum* Freyn in Bull. Herb. Boiss., ser. 2, III (1903) 561, non Huth, — Ic. Aitch. et Hemsl., l. c., tab. III; Bot. Mag. t. 7049. — Exs.: HFR No. 1359.

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Perennial; stem 30–75(85) cm high, covered in lower half with few very small appressed hairs or glabrate, glabrous above; leaf blade dissected into 5 petiolulate lobes (petiolule of middle lobe longer, those of each pair of lateral lobes short and united into a common petiolule, giving the leaf a ternate appearance), the lobes repeatedly ternately dissected into narrow-linear subfiliform elongate sections, not more than 1–1.5(2) mm broad; raceme to 35 cm long, with a glabrous axis; bracts linear-lanceolate, acuminate, slightly shorter than or about half as long as pedicels, glabrous; bracteoles linear, ca. 3–4 mm long, glabrous, disposed above middle of pedicels; pedicels 0.8–1.5 cm; tepals obtuse, the lower lateral obovate, the upper lateral broad-obovate, 1.2–1.6 cm long, 0.8–1.1 cm broad; spur short, almost straight, horizontal, rather obtusely pointed, 1–1.1 cm long, ca. 2–2.25 cm wide; follicles 0.7–0.95 cm long. May–July. (Plate XI, Figure 1, a–e).

Dry semidesert slopes in the foothills and the lower mountain zone; to 1,200 m. — Centr. Asia: T. Sh. (W.), Pam.-Al., Mtn. Turkm. Gen. distr.: Iran. Described from the vicinity of Meshed. Type in Geneva.

Note. Morphologically, this species is extremely sharply demarcated from *D. biternatum*, with which it is often confused. Apart from the differences already mentioned by V. I. Lipsky (l. c.), the extremely distinctive structure of the follicles, which have prominent thickish ribs, should be noted.

Economic importance. Tinctorial plants. From the flowers a yellow dye is extracted, the base of which appears to be quercetin (C₁₅H₁₀O₇). In

the opinion of N. P. Tarasov (O novom primenii kraski, poluchaemoi iz tsvetov *D. semibarbatum* Bien.) — New Uses for the Dye Obtained from the Flowers of *D. semibarbatum* Bien. in *Izv. Tadzh. Bazy Akad. Nauk* I, 1 (1933) 61, the plant is suitable for the manufacture of light filters, for which purpose it is introduced into melted gelatin, chemically treated, and deposited on glass; an intense yellow color is produced.

Genus 525. **ACONITUM*** L.**

L. Gen. pl. ed.5 (1754) 236.

184 Flowers zygomorphic; pedicels with 2 opposite or slightly distant bracteoles; calyx colored, 5-sepaled; upper sepal with a kind of hood, the lower 2 usually unequal. Only 2 of the petals develop, transformed into nectaries; staminodes 3–8; stamens numerous; follicles 3–7, many-seeded. Perennial herbs with an erect, occasionally twining stem. Vernacular name: borets.

Economic importance. The poisonous properties of *Aconitum* were known in antiquity, when it was used both in medicine and for the preparation of various poisons; for example, a preparation made from *A. lycoctonum* was used to poison wolves, hence its name "volkoboinik" [wolf's bane]. Today the alkaloids aconitine and pseudoaconitine, obtained from the roots, have various medicinal uses (tuber *Aconiti*). Not only the roots but the entire plant is poisonous and there have been occasional cases of livestock poisoning from grass and hay containing *Aconitum*]

1. Perianth persistent in fruit; leaf lobes narrow-linear or linear-lanceolate, appressed to stem or distant; pistils 5 (or if 3 then the perianth deciduous); flowers yellow, rarely yellow with a bluish tinge (Section 1. *Anthora* DC.) 2.
- + Perianth not persistent; spur spirally or semispirally curved, or capitate, rarely absent; nectary lamina more or less inflated; flowers flowers yellow, lilac-blue, pale blue, or violet; pistils 3–7 3.
2. Nectaries notched below the capitate spur, with narrow lamina, and a very large upcurved bilobate lip; pistils always 5 1. *A. anthora* L.
- + Nectaries with a slightly curved spur and a narrow slightly convex lamina; hood deeply concave above beak, thus upper part of hood almost covering the beak; in dried specimens pistils 3, flowers always yellow, with more or less prominent dark veins..... 2. *A. komarovii* Steinb.
3. Hood high, cylindric-conical, 2–4 times as high as wide at level of beak, with the exception of *A. apetalum*, in which hood is as long as or shorter than its width at level of beak; pistils 3 (Section 2. *Lycocotnum* DC.) 4.
- + Hood low, cupola-shaped, its width at level of beak subequal to, slightly less, or slightly more than its height; flowers violet-blue, rarely yellow 18.

* From aconiton, the name of a poisonous plant growing on sheer cliffs, from Theophrastus and Nicander.
 ** Treatment by E.I.Shteinberg.

- 185 4. Stems twining, flowers bicolor; hood white, lower tepals dingy violet 3. *A. albo-violaceum* Kom.
- + Stems erect or very slightly flexuous 5.
5. Nectaries very small; spur together with claw not more than 7.5 mm long; hood 5-8 cm high 10. *A. apetalum* (Huth) B. Fedtsch.
- + Nectaries always long 6.
6. Whole plant continuously and densely pubescent; flowers purple-violet 4. *A. desoulavyi* Kom.
- + Less densely pubescent plants; flowers yellow, greenish yellow, light yellow, white, or dingy grayish violet, sometimes when dry with a reddish tinge 7.
7. Flowers greenish yellowish, strongly pubescent with long straight yellow and ca. 1 cm-long filiform hairs; bracts and bracteoles also strongly pubescent 7. *A. sukaczewii* Steinb.
- + Flowers of a different color (but not greenish-yellowish) 8.
8. Flowers yellow; leaves with broad-rhombic lobes (in shape resembling *Ranunculus pedatifidus*), borne mainly in lower third and at base of stem 9.
- + Leaves of a different shape 10.
9. Hood 10-13 mm high 5. *A. ranunculoides* Turcz.
- + Hood 17-23 mm high 6. *A. ajanense* Steinb.
10. Plants with dingy yellow flowers and a spirally curved spur; leaf lobes usually shallowly incised 11.
- + Plants with dingy violet or grayish violet or yellow flowers; leaf lobes divided to one-third or one-half or almost to base; spur slightly hamately or semispirally curved 12.
11. Flowers dingy yellow, leaves very large, to 20 cm in diameter 8. *A. umbrosum* (Korsh.) Kom.
- + Flowers yellow, leaves to 10 cm in diameter 9. *A. crassifolium* Steinb.
12. Flowers dingy violet or grayish violet, sometimes with a reddish tinge 11. *A. excelsum* Rchb.
- + Flowers yellow or light yellow or white (very rarely pale violet) . . . 13.
13. Flowers white or light yellow or pale violet with a narrow high (to 4 cm) cylindric hood (Caucasus) 12. *A. orientale* Mill.
- + Flowers bright yellow 14.
14. Ovaries pubescent 15.
- + Ovaries glabrous 16.
15. Leaves 3-5-pedatisect to base or almost to base; segments divided into broad-lanceolate or narrow-lanceolate lobes falcately curved at the apex; hood with a girdle above the beak 13. *A. barbatum* Pers.
- + Leaves parted to one-half to three-fourths into rhombic lobes; hood almost without a girdle above the beak . . . 15. *A. lasiostomum* Rchb.
- 186 16. Axis of inflorescence covered with short crisp appressed hairs 14. *A. kirinense* Nakai.
- + Axis of inflorescence covered with straight distant hairs 17.
17. Leaf lobes shallowly incised, with short sometimes rounded-acuminate teeth; leaf blade more or less densely pubescent on both surfaces 16. *A. krylovii* Steinb.

- + Leaf lobes deeply incised, with long sometimes short, always acute teeth; leaf blade glabrous above, with crisp hairs along the veins beneath, the entire lower surface occasionally with a scant pubescence 17. **A. monticola** Steinb.
18. Rootstocks of rounded or oblong tubers not united into a beaded chain (Section 3. *Napellus* DC.) 19.
- + Rootstocks a chain of conerescent beaded conoid tubers (Section 4. *Catenata* Steinb.) 46.
19. Tubers as small as peas; spur of nectary not developed, appearing truncate 42. **A. biflorum** Fisch.
- + Tubers larger 20.
20. Flowers white with a violet or blue border, or azure with white stripes, rarely violet; hood high, cupola-shaped or campanulate . . . 21.
- + Flowers violet, pale lilac, blue-violet, azure, rarely yellow. 22.
21. Flowers white with a violet border, rarely violet; leaves lustrous above; stamens pubescent; pistils 3-5 19. **A. stoerkianum** Rchb.
- + Flowers azure with white stripes; hood high and very distant from lateral tepals; stamens glabrous; pistils 5 18. **A. variegatum** L.
22. Hood with a more or less attenuate beak; leaf lobes with acute teeth; raceme short, terminal; pistils 3, glabrous (Caucasus) 23.
- + Hood with a slightly attenuate beak; if beak long, then other characters different 25.
23. Stem with a short down in its upper part, in the inflorescence, and on the outside of the tepals 20. **A. pubiceps** (Rupr.) Trautv.
- + Stem glabrous; tepals usually ciliate only at margins; flowers bright blue 24.
24. Stem to 50 cm, unbranched; raceme few-flowered, hood low (5-10 mm high), tapering to a long beak . . . 21. **A. cymbulatum** (Schmalh.) Lipsky.
- 187 + Stem usually tall, 50-100 cm, sometimes branched; hood to 2.5 cm high, broadly cylindric, tapering to a long beak 22. **A. nasutum** Fisch.
25. Stem with more or less long runners produced in axis of leaves (Sakhalin) 40. **A. flagellare** (F. Schmidt) Steinb.
- + Stem without runners 26.
26. Lamina of nectary with spur and lip to 3 mm long 27.
- + Lamina of nectary with spur and lip longer than 3 mm or strongly inflated 29.
27. Stem simple, not tall, inflorescence a raceme of few large violet flowers; nectary not reaching apex of hood; pistils 5, slightly pubescent 41. **A. delphinifolium** DC.
- + Stem simple, with only the inflorescence sometimes branched; leaves rounded, the radical with obtuse flat teeth; flowers pale lilac with yellowish lateral lobes; hood navicular (Central Asia) 28.
28. Nectary pyriformly pendent, with nectar in its lower part; lip in the form of 2 filiform processes; tubers 2 43. **A. rotundifolium** Kar. et Kir.
- + Nectary capitate, very slightly recurved, with nectar in its upper part; tubers several 44. **A. zeravschanicum** Steinb.
29. Stem twining or erect with a twisting tip, or else zigzag 30.
- + Stem erect 34.

30. Plants glabrous, rarely very slightly pubescent in the inflorescence 31.
+ Plants more or less pubescent 33.
31. Leaves dissected to base into 3-5 rhombic segments frequently with petiolules; stem flexuous, flowers recurved, pistils 5, usually glabrous 27. *A. raddeanum* Rgl.
+ Leaves parted to three-fourths or deeper but never to base 32.
32. Leaves more or less firm; stem almost straight or slightly flexuous distally; claw of nectary straight with a broad lamina to 5 mm broad and to 8 mm long, with a small lip (ca. 1 mm in diameter); spur small, slightly curved, capitate, to 1.5 mm long. . . 25. *A. fischeri* Rchb.
+ Leaves thin; stem strongly flexuous; claw of nectaries somewhat curved, with a lamina to 3 mm broad and to 10 mm long and a lip to 2 mm long and as broad; spur hamate, to 3.5 mm long 26. *A. arcuatum* Maxim.
- 188 33. Stems twining; leaves ternately or pinnately dissected into linear-lanceolate or ovate-lanceolate entire or more or less dentate segments; pistils 5, rarely 3, glabrous or pubescent 23. *A. volubile* Pall.
+ Stems straight; leaves dissected into linear-lanceolate or sublinear lobes; petioles ciliate on the upper side; pistils 5, slightly pubescent 24. *A. villosum* Rchb.
34. Nectaries with a strongly inflated lamina, to 2.5-5 mm broad 35.
+ Lamina of nectary 1.5-2.5 mm broad 40.
35. Flowers dingy violet; entire plant densely pubescent 28. *A. maximum* Pall.
+ Flowers dark violet, blue-violet, azure, or yellowish 36.
36. Pistils pubescent 37.
+ Pistils glabrous, rarely slightly pubescent (Altai) 39.
37. Flowers white or blue with a yellowish tinge; pedicels densely covered with long distant rufous hairs; pistils 3 32. *A. jaluense* Kom.
+ Pistils 5 38.
38. Leaves ternate; flowers dark violet-blue; follicles densely pubescent, divergent when ripe 33. *A. sichotense* Kom.
+ Leaves 5-7-partite, with narrow lobes, overall width 1-2 mm (rarely to 3 mm); follicles with long hairs on the dorsal surface 31. *A. macrorhynchum* Turcz.
39. Pistils 3; perianth azure, pilose 29. *A. sachalinense* Fr. Schmidt.
+ Pistils 5; perianth dark blue, glabrate 30. *A. kusnezoffii* Rchb.
40. Raceme compact, terminal 41.
+ Raceme loose 43.
41. Axis of inflorescence glabrous; flowers violet, glabrous on the outside; filaments pilose 38. *A. baicalense* Turcz.
+ Axes of inflorescence pubescent 42.
42. Flowers numerous, dark violet with a reddish tinge (when dry); inflorescence with distant short soft hairs; leaves thin, with acute teeth; pistils glabrous 36. *A. smirnovii* Steinb.
+ Raceme few-flowered; leaves not large, with large subobtusate teeth; pistils mostly hairy (Altai) 37. *A. altaicum* Steinb.

- 189 43. Stems slender to 3mm thick proximally; raceme of 2-9 violet flowers 34. *A. ambiguum* Rchb.
 + Stronger plants 44.
 44. Entire plant quite glabrous; lower bracts frequently very large, leaflike 35. *A. flerovii* Steinb.
 + Plants pubescent in region of inflorescence, rarely glabrous but then bracts not leaflike 45.
 45. Raceme loose, little branched or proximally branched, the axis with distant downy hairs; flowers dark violet 39. *A. czekanovskyi* Steinb.
 + Raceme strongly branched, its axis with a crisp pubescence, rarely glabrous; flowers violet, glabrous on the outside; filaments sparsely hairy or glabrous 38. *A. baicalense* Turcz.
 46. Tubers beaded, conrescent, large, (0.8)1-2.5 cm or more in diameter 47.
 + Tubers not large, 5-8mm in diameter; flowers relatively small 50.
 47. Leaves dissected into narrow-linear lobes; lobes of the second and third order 1.5-3mm broad; entire plant glabrous, rarely with small crisp hairs in region of inflorescence 48. *A. karakolicum* Rapcs.
 + Leaf lobes broader 48.
 48. Hood narrow; stems simple, not high 46. *A. angusticassidatum* Steinb.
 + Hood broad 49.
 49. Tubers 2-2.5 cm or more in diameter; middle leaf segments in their undissected part 0.4-1.5 cm thick; flowers violet 47. *A. soongoricum* Stapf.
 + Tubers 1-2 cm in diameter; middle leaf segments in their undissected part 2-3 cm thick; flowers azure 45. *A. talassicum* M. Pop.
 50. Axis of inflorescence and tip of pedicels with small crisp hairs; flowers (when dry) pale violet 49. *A. saposchnikovii* B. Fedtsch.
 + Axis of inflorescence and tip of pedicels with small straight hairs, rarely with an admixture of crisp hairs; flowers dark violet 51.
 51. Leaves 3-4 cm long, with straight teeth; pistils 4-5 50. *A. tranzschelii* Steinb.
 + Leaves 3-8 cm long, with slightly arcuately curved teeth pointing backward; pistils 3 51. *A. nemorum* M. Pop.

190 Section 1. *ANTHORA* DC., Syst. I (1818) 365.—*Anthoroidea* Rch., Monogr. *Aconit.* (1820) 33.—Flowers pale yellow, rarely bluish, even more rarely dark reddish lilac; nectary notched below the capitate spur, with a large bilobate upcurved lip, or nectary without a notch but with small lip, not upcurved; follicles 5 and fruiting perianth persistent, or follicles 3 with perianth deciduous; leaves palmately dissected into numerous linear, rarely linear-lanceolate segments with similar lobes; roots tuberous.

1. *A. anthora** L., Sp. pl. (1753) 532; DC., Prodr. I, 56; C.A.M. in Ldb., Fl. Alt. II, 280; Ldb., Fl. Ross. I, 65; Kryl., Fl. Zap. Sib., 1147; Syreishch., Fl. Mosk. gub. II, 140; Schmal'g., Fl. I, 30.—

* The name is derived from anti-thora (thora meaning death), since it was supposed that this plant could be used as an antidote.

A. anthora γ *confertiflorum* DC., Syst. I (1818) 366. — *A. de candollii* Rchb., Monogr. Aconitum (1820) 67, tab. III. — *A. pallasii* Rchb., l.c., 72, tab. VI A, B. — *A. nemorosum* M.B. in Rchb., l.c., 71, tab. VI. — Ic.: Rchb., Monogr. (1820) tab. 1, III (sub *A. de candollii* Rchb.), IV (sub *A. anthoroide* DC.), VI (sub *A. anthoroide* DC.), VI (sub *A. nemorosum* M.B. et *A. pallasii* Rchb.); ej. III Spec. Acon. (1823-27) tab. LIX, LX; LXI. — Exs.: Pl. orient. exsicc. No. 205 (var. *versicolor* Stev.).

Perennial; tubers ovate or oblong, to 5 cm long, 1.5 cm broad; stem erect, 15-100 cm, in lower part usually few-leaved and glabrous, in upper part with a more or less dense short down or with distant hairs; leaves 1.5-7 cm long, 2-10 cm broad, palmately multipartite with numerous narrow linear or linear-lanceolate lobes 3, rarely 4 mm broad (var. *latilobum* Sér.), the lower leaves long-petioled, the upper densely covering stem, short-petioled; inflorescence a simple or branched terminal raceme 6-40 cm long; flowers yellow, rarely yellow with a bluish tinge, dark violet (var. *versicolor* Stev. — Caucasus), or bluish; withered perianth persistent for some time in fruit, covered on the outside with small yellow hairs or glabrate; hood broadly rounded, above the beak more or less concave, 8-20 mm long, * 8-15 mm broad at level of beak and 7-12 mm high; lateral tepals rounded-triangular, with more or less long hairs on the inside and small hairs in the middle part on the outside, ca. 1.7 cm long and ca. 1.5 cm broad, lower tepals unequal, ca. 1.7 cm long and 0.5 and 0.7 cm broad; nectaries with a notch below the capitate spur, a narrow lamina, and a very large upcurved bilobate lip 2-3 mm in diameter; filaments broadened proximally, with or without teeth in middle part, in upper part with hairs or glabrous; pistils and follicles 5, uniformly pubescent or glabrous with hairs at apex of ovary or on the dorsal surface (var. *anthoroideum* (DC.) Rgl.); seeds triquetrous, not broadly scarious-winged on the ribs. July-August. (Plate XII, Figure 1, a-i).

Steppe meadows, rarely in inundated or dry-valley meadows, herb-covered and stony slopes, and mountain river valleys; in the alpine zone in alpine meadows and tundras, and on glacial moraines. — European part: M. Dnp., Bl., L. Don, Transv., L.V., Crim.; Caucasus: Cisc., E. and W. Transc., Dag.; W. Siberia: Irt., Alt.; E. Siberia: Yenis. (S.); Centr. Asia: Dzu.-Tarb. Gen. distr.: Centr. Eur., Atl. Eur., W. and E. Med., Bal. Described from W. Europe. Type in London.

Note. In the USSR, *A. anthora* L. varies greatly in the relation between the pubescence of the entire plant and that of the stamens and ovaries, as well as in the relation between the overall dimensions of the plant and of the leaves. Monographic treatment of this collective species will make it possible to separate a series of small-flowered races.

For the present we shall retain the blue-flowered race *A. anthora* under the name of var. *versicolor* Stev. The Caucasian var. *versicolor* differs greatly both in color and in pubescence from the blue-flowered W. European race, *A. coeruleum* Blocki, so far known only from Galicia. As far as can be judged from dried specimens, these

* In the sections *Authora*, *Napellus*, and *Catenata*, length of hood is taken as the distance from its apex to its point of attachment to the pedicel; width of hood is measured at level of beak; its height is taken as the distance from its apex to the base of its notch.

varieties share the general violet tinge, but in *A. coeruleum* all the tepals are concolor, while in var. *versicolor* the lateral lower tepals are mostly lighter, though violet specimens are also encountered. Apparently the pubescence of the inflorescence of *A. coeruleum* consists of small crisp hairs, while in var. *versicolor* Stev. the hairs of the inflorescence are distant. Specimens of *A. anthora* with bluish and lilac flowers have been found in Siberia and eastern Altai.

Economic importance. The bitter root of *A. anthora* was formerly used in medicine (*radix Anthorae*) as an antidote to poison, to cure fever, and to combat helminths, etc.

2. *A. komarovii* Steinb., nomen novum. — *A. coreanum* Levl. in Fedde, Repert sp. nov. VII (1909) 137/139 101, non Raps. (1907). — *A. koreanum* Nakai in Bot. Mag. Tokyo XXVIII (1914) 57. — *A. anthora* (non L.) Kom., Fl. Mandsh. II, 259.

Perennial; roots in the form of fusiformly thickened tubers; stem to 1.5 m, erect, slightly flexuous distally, at the middle evenly leafy, branching mostly confined to the inflorescence, glabrous in lower part, in upper part and on pedicels densely covered with small falcate hairs; leaves to 10 cm broad and as long, 5-palmatisect, the 2 outer segments proximally connate, the middle segment narrowly cuneate, as if petioluled; segments parted into 1–2 cm long, 1–3 mm broad lobes; lower leaves with long (to 10 cm) petioles, the upper with short appressed petioles; leaves glabrous, only the upper sometimes with a slight pubescence of short falcate hairs, all leaves with prominent midribs beneath; inflorescence a simple or branched raceme; flowers 2–3 cm long, 1–2 cm broad, yellow with prominent darker sometimes slightly bluish venation, pedicels 0.5–4 cm long, with 2 short filiform bracts at about their middle; perianth densely covered on the outside with small yellowish crisp hairs and isolated black hairs (perianth not persistent in fruit); hood navicular, above the beak strongly concave, in full flower, after drying, apparently flattened, 1.5–2.5 cm long, 1–1.8 cm broad, and 0.7–1.3 cm high; nectary spurs capitate, slightly curved, with prominent undulate veins on the surface visible with a hand lens), sometimes with sparse hairs; claw of nectary 1.5–2 cm long, the lamina with incurved margins, one-third to two-fifths as long as the claw, with 2 conspicuous veins, broadening toward base, terminating in 2 lobes or apically rounded, and with a saccate outgrowth where claw and lamina meet; filaments gradually tapering to apex, with hairs at the margins and on the back in the middle part; pistils 3, densely covered with whitish falcate hairs; fruit less pubescent. August–September. (Plate XII, Figure 2, a–i).

Sparse shrub thickets, dry shortgrass meadows, and argillaceous-stony mountain slopes. — Far East: Uss. Gen. distr.: Jap.-Ch. Described from Korea. Type in Leningrad.

Section 2. **LYCOCTONUM** DC., Syst. (1818) 366. — *Lycoctonoidea* Rchb., Mon. gen. Ac. (1920) 32. — Perianth deciduous; follicles 3; flowers light yellow, yellow, pale violet, or reddish; hood cylindric or conical, apically somewhat recurved at maturity; nectary with a straight or almost straight claw, a spiral or semispiral slender spur, a narrow, not saccately

inflated lamina, and a small straight lip; root mostly a taproot of connate root fibers.

Series 1. *Volubilia* Steinb. — Twining plants with large cauline leaves 3-cleft into broad lobes; flowers with a white hood and dingy violet lower tepals; pistils densely pubescent. — Far East.

3. *A. albo-violaceum* Kom. in A.H.P. XVIII No. 6 (1901) 439; Kom., Fl. Mandsh. II, 251; Kom. and Alis., Opred. rast. Dal'nevost. kr. I, 535; Nakai in Journ. Sc. Imp. Univ. Tokyo XXVI (1909) 27; Nakai, Flora koreana in Journ. of the Bot. Mag. (Tokyo) XXXI (1917) 221. — *A. lycoc-tonum* var. *septentrionale* lusus *volubilis* Maxim. in herb. — Ic.: A.H.P. XXII (1904) tab. 5. —

193 Perennial; stem 2–3 mm thick, semidecumbent, semitwining, frequently forming large entanglements, entirely covering adjacent shrubs, erect or ascending at base, weak, covered with very sparse appressed hairs, their upper twining part fairly densely pubescent; radical leaves long-petioled (to 30 cm or more), 15–20 cm broad, 8–12 cm long, orbicular, cleft to the middle into 5 broad lobes (to 5 cm broad, at base), each lobe with 3 obscure lobules with rounded teeth, each tooth bearing a gland; cauline leaves short-petioled, triangular, trilobate, more similar to some species of *Geranium* than normal for *Aconitum*; leaves with sparse short yellowish hairs covering entire surface above, only along the veins beneath, ciliate-margined; inflorescence of numerous smallish rather loose racemes in leaf axils; inflorescence branches and pedicels densely covered with bright yellow rigid hairs, bracts narrow-linear, at base of pedicels; perianth with long straight hairs on the outside; hood broadly clavate, closed, white, 17–23 mm high, 4–7 mm broad in upper part, 3–5 mm in middle part, 10–14 mm broad at level of beak; lateral tepals 10–11 mm long, 8–10 mm broad, violet, on the outside glabrous with a dark stripe, covered with hairs at the middle, on the inside also glabrous with a tuft of long yellow hairs at outer margin; lower tepals unequal, 8–11 mm long, to 3 and to 6 mm broad, respectively, on the outside pubescent on the inside glabrous with a tuft of yellow hairs at outer margin of largest tepals; lateral and lower tepals ciliate-margined; nectaries with an almost straight claw (15–18 mm long); spur slender, somewhat reflexed, semispirally curved; lamina straight, terminating in an obscure lip; filaments glabrous, broadened from the middle; pistils 3, with a dense dorsal ridge of long yellow hairs, apparently not deciduous at maturity. July–August.

Always in deep shade and on stony humous soil of riparian valley forests and banks of rivulets. — Far East: Ze.-Bu., Uss. Gen. distr.: Jap.-Ch. Described from Manchuria (between Ningut and Omoso). Type in Leningrad.

Series 2. *Pubescentia* Steinb. — Strong erect plants, densely and uninterruptedly pubescent; flowers purple-violet — pistils glabrous or slightly pubescent. — Far East.

4. *A. desoulavyi* Kom. in Bull. Jard. Bot. Pétersb. XVI (1916) 168; Kom. and Alis., Opred. rast. Dal'nevost. kr. I, 536.

Perennial; stem to 1 m high, strong, erect or slightly flexuous, densely covered with soft spreading white hairs especially in the inflorescence; radical leaves with long (to 20 cm) pubescent petioles, orbicular, quinquepartite, to 10 cm long, to 17 cm broad, their lobes coarsely incised dentate, each tooth with an apical gland; cauline leaves 1-2, short-petioled, resembling radical leaves in shape and pubescence; leaves covered with soft appressed hairs above, more densely pubescent along the veins beneath; inflorescence racemose, branching in lower part, branches to 8 cm long; bracts small, to 5 mm long, linear, pubescent, on middle part of pedicels; flowers purple-violet; hood clavate, pubescent, with an obscure triangular tooth on each side, with a very acute beak below; 1.7-2.5 cm high, 4-7 mm broad in middle part, 10-13 mm broad at level of beak; lateral tepals to 1 cm long, to 7-8 mm broad, rounded-triangular, on the outside glabrous with a dark hairy stripe only in the middle part, on the inside glabrous with a tuft of short hairs at outer margin; lower tepals unequal, to 10 mm long, and to 4 and 9 mm broad, respectively, pubescent on the outside, glabrous on the inside; nectaries with a slightly curved claw, a slender semispirally curved spur, and a narrow lamina terminating in a smallish notched-truncate lip; filaments glabrous, with 2 teeth in the middle or broadened from the middle; follicles 3, slightly pubescent or glabrous. July-August.

Forest margins. — Far East: Uss. **Gen. distr.:** Jap.-Ch. Described from the coast at Nakhtakhe Bay. Type in Leningrad.

Series 3. **Ranunculoidea** Steinb. — Plants with cuneately parted leaves resembling those of *Ranunculus pedatifidus*; flowers yellow, spur semispirally curved; stamens glabrous; pistils glabrous, rarely pubescent.

5. **A. ranunculoides** Turcz., Fl. baic.-dah. I (1842) 78; Ldb., Fl. Ross. I, 67. — *A. lycoctonum* β Turcz., l.c. — *A. lycoctonum* δ *pallidum* Lus. a. *ranunculoides* Rgl., Bull. Soc. Nat. Moscou XXXIV (1861) 75.

Perennial; stem to 70 cm high, simple, slender (2 mm in diameter in middle part), slightly lustrous, glabrous only in upper part, in inflorescence more or less pubescent, with small crisp hairs; radical leaves 2-4, their petioles 7-15 cm, glabrous, rarely with very sparse hairs, the blade to 5 cm long and to 8 cm broad, orbicular, with sparse appressed hairs above, more densely hairy along the veins, lighter-colored beneath, quite glabrous or with sparse long hairs confined to the veins; leaves palmately parted into 3-5 lobes, each with 3 lobules terminating in rounded acuminate glanduliferous teeth, the middle lobe usually with 3, the lateral with 2 teeth; leaves ciliate-margined; inflorescence a very loose terminal raceme of 4-10 flowers; flowers yellow, the lower on pedicels to 5 cm long, with small filiform bracteoles in lower half of pedicels; hood cylindric, with a curved apex at end of flowering, covered with small crisp hairs; hood 1-1.3 cm high, to 4 mm broad in middle and upper parts, to 1 cm broad at level of beak; lateral tepals 7-9 mm broad and as long, on the outside glabrate with a single median row of hairs, on the inside also glabrous with a distal tuft of marginal long yellow hairs; tepals slightly ciliate-margined; lower tepals slightly unequal, to 1 cm long, ca. 2-2.5 and 3.4 mm broad,



PLATE XII. 1 - *Aconitum anthora* L.; 2 - *A. komarovii* Steinb. Details of each species: a) habit, b) tubers, c) single flower, d) hood, e) middle and lower tepals, f) nectary, g) stamen, h) young follicles, i) part of stem and inflorescence.

on the outside pubescent, on the inside glabrous with a tuft of long hairs at outer margin of the largest tepal, more or less ciliate-margined; nectaries with a straight claw, the lamina half as long as the claw terminating in a cordate or orbicular lip; spur semispiral; filaments glabrous, broadened from the middle, with or without 2 teeth at the middle; pistils 3, glabrous, or slightly pubescent when young. July–August. (Plate XIII, Figure 1, a–f).

Larch and spruce forests. — E. Siberia: Lena-Kol., Ang.-Say., Dau.; Far East: Ze.-Bu. (W.). Endemic. Described from the vicinity of Gorbitsa at the mouth of the Urov River in Transbaikalia. Type in Leningrad.

6. *A. ajanense* Steinb., sp. nova in Addenda VI, p. 556. — *A. lycoc-tonum* var. *cynoctonum* Trautv. et Mey. in Middend. Reise Band. I, Theil 2 (1856) 12. — *A. lycoc-tonum* β , a. Ldb., Fl. Ross. I (1842) 66 p.p.

Perennial; stem to 60 cm, erect, unbranched or slightly branched only at base of inflorescence, glabrous in lower part, upper part covered with yellow crisp hairs, especially in the inflorescence; leaves crowded at base and in lower part of stem, with long (to 20 cm) petioles, petioles sometimes with straight sparse hairs, more often glabrous; leaf blade thin, glabrate on both surfaces, with sparse hairs above, along the veins dark green above and gray-green beneath, lustrous ciliate-margined, resembling in shape the leaves of *Aconitum ranunculoides* Turcz.; inflorescence a terminal sparsely flowered raceme of large sulfur yellow flowers, on pedicels (about as long as the flowers) with small filiform bracts about their middle or at their base; hood broadly clavate, with distant or slightly crisp yellow hairs, beak strongly produced anteriorly and with a dark apical patch, 17–23 mm high, to 7 mm broad in its upper and middle parts, to 15 mm broad at level of beak; lateral tepals ovate, 0.8 cm long, 0.7–0.9 cm broad, on the outside glabrous with a dark pubescent stripe in the middle, on the inside also glabrous with a distal tuft of long yellow hairs at outer margin, long-ciliate-margined; lower tepals attenuate toward base, unequal, 0.7–1 cm long, 0.2–0.3 and 0.4–0.5 cm broad, respectively, on the outside pubescent, on the inside glabrous, with a tuft of long hairs on outer margin of largest tepal, ciliate-margined; spur of nectary semispirally curved, the lamina one-third as long as the claw, terminating in an orbicular lip; filaments glabrous, broadened from the middle, with teeth on one or both sides; pistils 3, glabrous, rarely pubescent. July–August.

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Valley forests on the coast of the Sea of Okhotsk. — Far East: Uda, Sakh. Endemic. Described from the shores of Ayan Bay (collections of the Hydrographic Expedition of the Eastern Ocean [Pacific Ocean], 1916). Type in Leningrad.

Note. *A. ajanense* is closely related to *A. ranunculoides* Turcz. and may be considered as a far Eastern race of the latter. It is distinguished from *A. ranunculoides* by its larger flowers, the shape of its hood, and its nectary spur.

Series 4. *Longibracteolata* Steinb. — Plants with filiform, long (to 1 cm) bracts and similar bracteoles adjacent to flower; pubescence of long yellow hairs; spur capitate, slightly curved pistils; glabrous. — Lake Baikal.

7. *A. sukaczewii* Steinb., sp. nova in Addenda VI, p. 557.

Perennial; stem erect, 40–45 cm, covered with soft straight distant hairs, pubescence in the inflorescence denser, of yellowish hairs; radical leaves 1 or 2, with long (15–20 cm) petioles covered with distant hairs; leaf blade pentagonal in general outline, to 4–7 cm long, 8–10 cm broad, parted to three-fourths into broadly cuneate nonoverlapping lobes, terminating in rounded-acuminate glanduliferous lobules; leaf blade covered with short appressed hairs above and with long straight hairs confined to the veins beneath, ciliate-margined; in cauline leaves the lobules, if present, narrower than in radical leaves; inflorescence a rather loose simple terminal raceme of greenish yellowish flowers with short (3–5 mm) pedicels; bracts to 1 cm long, linear, adjacent to flower; hood conical, covered with straight slightly accumbent hairs, 1–1.5 cm, 4–5 mm broad in middle part, 10–14 mm broad at level of strongly produced beak; lateral tepals oblong, 10–12 mm long, 7–9 mm broad, glabrous, with a yellow stripe, covered with spreading hairs, with a tuft of hairs in middle part on the outside and a subterminal tuft on the inside; lower tepals unequal, ca. 1 cm long, ca. 3 and 6 mm broad, on the outside pubescent, on the inside glabrous with a tuft of hairs at outer margin of large tepal, ciliate-margined; nectaries with a straight claw, an almost straight somewhat thickened spur, and a smallish bilobate lip; stamens 10–14, filaments glabrous, gradually broadening from the middle; follicles 3, glabrous. July. (Plate XIII, Figure 3, a–d).

Mossy Siberian stone pine forests. — E. Siberia: Ang.-Say. Endemic. Described from Lake Baikal, Uluntui gorge, near Slyudyanka station. Type in Leningrad.

Series 5. *Umbrosa* Steinb. — Plants with dingy yellow or yellow flowers and a spiral spur; pistils glabrous or slightly pubescent. — Far East.

- 199 8. *A. umbrosum* (Korsh.) Kom. in A. H. P. XXII (1904) 250. — *A. lycoctonum* subsp. *genuinum* f. *umbrosum* Korsh. in A. H. P. XII (1892–1893) 299–300. — *A. lycoctonum* ϵ *vulparia* Rgl. in Bull. Soc. Nat. Mosc. XXXIV (1861) 79 (pro parte). — *A. pallidum* Maxim., Prim. Fl. Amur. (1859) 24, non Rchb. — Ic.: Trans. of the Sapp. Natur. Hist. Soc. XIV, (1935) t. 2. — nectary.

Perennial; stem somewhat ascending, subsequently erect, 80–120 cm high, in lower part slightly pubescent inflorescence strongly pubescent with short crisp hairs; radical leaves 1 or 2, long-petioled (to 40 cm), the blade to 10 cm long and 20 cm broad; cauline leaves 2–3, with very short petioles; leaves 5–7-partite, the lobes broad-rhombic, cuneate, separating at apex into 3 coarsely dentate lobules; lobes slightly overlapping; leaves covered with short appressed hairs especially along the veins above, usually pubescent only along the veins beneath, ciliate-margined; inflorescence a loose terminal few-flowered raceme slightly branched at base; lower bracts leaflike, the middle one lanceolate, the upper linear; lower peduncles spreading, ascending, 40–55 mm long; flowers dingy yellow; bracteoles small, filiform, at middle part or at base of pedicels; hood broadly cylindric, slightly compressed in the middle, apically broadened with a retrorse beak, covered with very small crisp hairs, 15–17 mm long, 7–10 mm broad in middle part, 10–13 mm at level of beak; lateral tepals orbicular or

oval-rounded, 9–11 mm long and almost as broad, on the outside glabrous with small hairs only in middle part, on the inside also glabrous with a terminal tuft of long yellow hairs, the tepals long-ciliate at margin; lower tepals somewhat unequal, 7–9 mm long, 2–4 mm broad, on the outside pubescent, on the inside quite glabrous and the largest tepal ciliate-margined with a terminal tuft of long hairs; nectaries with a spirally recurved spur and a short straight emarginate lip; filaments glabrous, broadened from the middle, with or without 1 or 2 teeth on each side; pistils 3, glabrous or slightly pubescent. June–August. (Plate XIII, Figure 2, a–d).

Mountain slopes, river valleys, dense shady broadleaf and coniferous forests, and damp soil rich in humus. — Far East: Okh., Ze.-Bu., Uda, Uss., Sakh. **Gen. distr.:** Jap.-Ch. Described from an area near the settlement of Bidzhanskoe on the Amur River. Type in Leningrad.

9. *A. crassifolium* Steinb., sp. nova in Addenda VI, p. 557.

Perennial; stem to 70 cm, erect or slightly flexuous, simple, pubescent throughout, in lower part sparsely, in upper part, especially the inflorescence, densely covered with small crisp yellowish hairs; leaves 4 or 5 at base of stem, petioles 5–15 cm bearing long sparse hairs; leaf blade rounded-pentagonal, in general outline 4–6 cm long, 6–10 cm broad, parted to three-fourths into rounded broad-rhombic lobes, each lobe divided into 2–3 lobes of the second order with 2 or 3 obtuse glanduliferous teeth; cauline leaf 1, with more acute teeth, or none; lower lobes not overlapping; leaves covered with appressed straight hairs above and mainly along the veins beneath, ciliate-margined; inflorescence a few-flowered terminal raceme frequently branched proximally; peduncles long, very distant (4–20 cm apart); flowers yellow; pedicels as long as or much shorter than the flowers, with small filiform bracteoles in middle part or at base; hood conical, with a forward protruding beak, covered with yellow crisp, rarely short straight hairs, 1.8–2.5 cm high, 5–8 mm broad in upper and middle parts, 12–15 mm broad at level of beak; lateral tepals orbicular, 0.7–0.9 cm long, almost as broad, on the outside glabrous, with small hairs confined to middle part, on the inside also glabrous with a terminal tuft of long yellow hairs; lobe margins eciliate or slightly ciliate; lower tepals unequal, 0.7–0.9 cm long and 0.2–0.4 cm broad, respectively, attenuate, on the outside pubescent, on the inside glabrous, largest tepal with a terminal tuft of long yellow hairs, ciliolate-margined; spur spirally, rarely semi-spirally curved somewhat like *A. umbrosum* (Korsh.) Kom.; filaments glabrous, broadened from the middle, with or without teeth on both sides; pistils 3, more or less pubescent. July–August.

Paths and clearings of coniferous forests. — Far East: Uss. Endemic. Described from the Maritime Territory (Sovetskaya Gavan). Type in Leningrad.

Series 6. *Micrantha* Steinb. — Flowers with a very short hood (4–8 mm long) and extremely small nectaries, spur with claw 5–6 mm long. — Central Asia.

10. *A. apetalum* (Huth) B. Fedtsch., comb. nova. — *A. lycocotum* L. var. *micranthum* Rgil. in A. H. P. VIII (1884) 641. — Delphinium

apetalum Huth in Engl. Bot. Jahrb. XX (1895) 398. — *A. lycoctonum* forma B. Fedtsch. in Bull. l'Herb. Boiss. IV No. 9 (1904) 914. — Russian name: akonit melkolepestnyi [small-petaled].

201 Perennial; stem to 2 m, erect, strong, to 1.5 cm thick, glabrous or pubescent in lower part with retrorse straight hairs, middle part and inflorescence with small simple crisp hairs, branching only in the inflorescence; radical and lower cauline leaves with long (30–40 cm) petioles, bearing straight hairs, rarely glabrous and costate; leaf blade reniform-rounded, to 15 cm long, to 25 cm broad, parted into 5–7 broadly cuneate overlapping lobes, each lobe terminating in 3 large lobes of the second order and further separated into 3 lobules with large acuminate teeth; shape of cauline leaves similar to radical leaves, like them petiolate with long internodes; all leaves glabrous above, and with crisp hairs along the veins beneath, crisp-ciliate-margined; inflorescence a long (to 60 cm) many-flowered raceme branched in its lower part; flowers smallish, yellow (grayish brown when dry), pedicels 5–10 mm, about as long as the flowers, bearing proximal 2 filiform bracteoles, 8–11 mm long, hood conical, not high (4–8 mm high), with a strongly protruding beak 8–13 mm long, the hood covered with small falcate-crisp hairs, ca. 3 mm broad in upper and middle parts, 8–11 mm broad at level of beak; lateral tepals rounded-oval, 8–10 mm long, 6–7 mm broad, on the inside quite glabrous, on the outside with a slight pubescence of short crisp hairs in middle part, margins slightly ciliate; lower tepals slightly unequal, 7–9 mm long and 2 and 3 mm broad, respectively, on the outside with short straight appressed or crisp hairs, on the inside quite glabrous, very slightly ciliate-margined; nectaries very short, spur together with claw 5–6 mm long, the spur capitate, slightly recurved, the lamina half as long as the straight claw, terminating in a subobtusate lip; filaments quite glabrous, broadening from middle downward, rarely with one tooth in the middle; pistils 3, with yellowish hairs either uninterruptedly or only dorsally covered densely, rarely the hairs only in lower part of ovary or the hairs appressed; in mature follicles the hairs more sparse; seeds 3–6. July–September. (Plate XIII, Figure 5, a–c).

In the high-mountain zone. — Centr. Asia: Dzu.-Tarb. Gen. distr.: Kuldja. Described from Kuldja. Type in Leningrad.

Series 7. *Longicassidata* Steinb. — Length of hood to 4 times as great as its width. Mostly tall plants, sometimes very strong, with cuneate-lanceolate leaf segments or broad-rhombic lobes; flowers bright yellow or dingy violet, in the latter case the peduncles arcuate; ovaries pubescent or glabrous.

11. *A. excelsum* Rchb., III. sp. gen. Acon. (1820) LIII; Syreishch., III. Fl. Mosk. gub. II, 140; Kryl., Fl. Zap. Sib. V, 1151; Maevskii, Fl. Sr. Ross., ed. 6, 339. — *A. vulparia* C.A.M. in Ldb., Fl. Alt. II (1830) 287, non Rchb. — *A. lycoctonum* Ldb., Fl. Ross. I, 66; Turcz., Fl. baic.-dah. 77. — *A. lycoctonum* β septentrionale Schmalh., Fl. I (1895) 31. — *A. szeewaldianum* Prodan in Bul. Gard. Bot. Cluj VI, Nos. 3–4 (1926) 119. — Ic.: Rchb., III. sp. gen. Ac. tab. LIII; Syreishch., l.c., II, 140; Prodan in Bul. Gard. Bot. Cluj VI (1926) tab. IV. — Exs.: Pl. Finl. exs. No. 652.

202 Perennial; stem tall (65–200 cm), costate; stem, petioles, and pedicels covered with distant or slightly tangled hairs; leaves large, cordate-rounded or reniform-rounded, to 15 cm long, to 25 cm broad, pedately 3–9-parted for two-thirds or three-fourths into broad sub-rhombic lobes apically 3-cleft into coarsely dentate lobules of the second order; radical and cauline leaves with very sparse slightly appressed hairs or glabrate above, more densely hairy beneath, especially along the veins, hairs straight, rarely slightly crisp, margins ciliate; inflorescence a loose terminal raceme, branching at base, peduncles and pedicels arcuate, divergent, with 2 bracteoles (1–10 mm long) at base or in middle part or below middle of pedicels; flowers dingy violet or grayish violet; hood with rather sparse small hairs, 1.5–2.5 cm high, conical-cylindric or subcylindric, 6–8 mm broad distally, 5–7 mm broad in middle part, and 10–15 mm broad at level of beak, frequently inclined forward, mostly narrowed in the middle, with a strongly produced beak; lateral tepals ovate-rounded or slightly oblique, 9–10 mm long, 7–8 mm broad, on the outside glabrous but for a line of hairs in middle part, on the inside with a tuft of long yellow sometimes profuse hairs at outer margin, margins slightly ciliate; lower tepals unequal, 7–10 mm long, ca. 2–2.5 and 4–5 mm broad, respectively, on the outside pubescent, on the inside glabrous with a tuft of yellow or whitish hairs at outer margin of largest tepal, rarely without such hairs; claw of nectary slightly curved in upper part, the spur annularly or spirally volute; filaments glabrous, broadened in proximal half; pistils 3, glabrous, rarely pubescent (var. *rubicundum* (Fisch.) Steinb.); seeds triquetrous, transverse-rugose, usually with pellucid-membranous scales on the wrinkles. June–August. (Plate XIII, Figure 4, a–d).

Forests, forest margins, tall herbaceous vegetation, forest meadows, bottomland deciduous forest, gullies, riverbanks, mountains to the timber-line, subalpine, and rarely alpine meadows. — Arctic: Arc. Eur.; European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. Dnp., U. V., M. Dnp., V.-Don, V.-Kama, Transv.; W. Siberia: Alt., Irt.; E. Siberia: Ang.-Say., Lena-Kol., Dau.; Centr. Asia: Dzu.-Tarb., T. Sh. Gen. distr.: Jap.-Ch. Described from vicinity of Moscow. Type in Vienna.

Note. *A. rubicundum* Fisch., described in Ser. Mus. helv. I (1823) 135 from Dauria and distinguished by pubescent ovaries and reddish and yellow middle tepals, is considered here as a variety, since, after examination of all the material of *A. excelsum* from Transbaikalia and the former Irkutsk Province, it was concluded that the entire range of transitions between densely pubescent ovaries (6 herbarium specimens) and quite glabrous ones exists. It is possible that the reddish tinge is due to drying; observations of live specimens is necessary to clarify this question.

203 **Economic importance.** The alkaloid aconitine, contained in *A. excelsum*, induces a general paralysis with death following within a few hours; sheep and goats are most often affected. (M. Papkov., Tr. Byuro po prikl. botanike, Vol. 4, 1911(1912), 552).

12. *A. orientale* Mill. in Gard. Dict. ed. III (1768) No. 10; Boiss., Fl. Or. I, 95; Suppl. 2; Somm. et Lev., Enum. 29; Rechb., III spec. gen. Ac. (1823–1827) 29; Busch in Fl. cauc. crit. III, No. 3 (1901) 74; Grossg., Fl. Kavk. II (1930) 102. — *A. ochroleucum* Willd., Sp. pl. 2 (1799)

1233; DC., Prodr. I, 58.— *A. lasiostomum* Spreng. Syst. II, 520, non Rchb.— *A. lycoctonum* var. *orientale* Rgl., in Bull. Soc. Nat., Mosc. (1861) III, 76.— *A. lycoctonum* subsp. *orientale* Schmalh., Fl. I (1895) 31.— Ic.: Rchb., l.c., tab. 29; M. Bieb. Cent. 12.

Perennial; stem to 2 m, erect, strong, to 8 mm thick proximally, slightly costate, glabrous, with small soft recurved hairs or more rigid straighter hairs in upper part, especially in the inflorescence; radical leaves with long petioles (to 20 cm), to 10–15 cm long and to 20 cm broad, 5–7-palmatipartite, with broad cuneate lobes, each divided into 3 lobules with acute teeth; cauline leaves similar to radical; cauline and radical leaves covered with very small sparse hairs or glabrous above, beneath pubescent mainly along the very prominent veins, all leaves ciliate-margined; inflorescence a compact few-flowered terminal raceme, branched in its lower part, the inflorescence branches rising arcuately; flowers white, yellowish or rarely pale violet (var. *coloratum* E. Bordz.), their pedicels short, arcuately curved with 2 bracteoles at base or in lower part; hood with small appressed hairs on the outside, narrow, conical-cylindric, 15–26 mm high, 2–3 mm broad in upper part, 4–5 mm broad in middle part, and 10–14 mm broad at level of beak, the latter protruding far forward; lateral tepals rounded-triangular, 6–10 mm long, 7–10 mm broad, on the outside pubescent in middle part, glabrous-margined, on the inside glabrous, with more or less profuse yellow hairs at outer margin, the hairs frequently protruding from the rictus, tepal margins almost eciliate; lower tepals unequal, 6–10 mm long, 2–3 and 4–5 mm broad, respectively, on the outside densely pubescent, on the inside glabrous with a tuft of whitish or yellowish hairs at outer margin of largest tepal, the tepals densely ciliate-margined; nectary with a very slender subannularly curved spur and a smallish emarginate lip, not usually reaching apex of hood; filaments glabrous, abruptly broadened from the middle, or with a tooth on each side; pistils 3, glabrous, rarely pubescent (var. *eriocarpum* Akinf.); fruits black. July–August.

Damp grass patches in the mountain-forest and subalpine zones.— Caucasus: Cisc., E. Transc., Dag. Gen. distr.: Bal.-As. Min. Described from cultivated specimens.

- 204 13. *A. barbatum* Pers., Syn. Pl. II (1807) 83; Rchb., III, sp. gen. Ac. (1823–1827) tab. XLV; Ldb., Fl. Ross. I (1842) 67; Kom. in A.H.P. XXII (1904) 249, pro parte; Kryl., Fl. Zap. Sib. V (1931) 1153.— *A. sibiricum* Poir., Encycl. meth. Suppl. I (1810) 113.— *A. hispidum* DC., Syst. I (1818) 367.— *A. gmelini* Rchb., Uebers. Gatt. Aconitum (1819) 63; III. spec. gen. Ac. tab. XLVI.— *A. barbatum* β *hispidum* DC., Prodr. I (1824) 58; Ldb., Fl. Ross. I, 67.— *A. squarrosum* DC., Syst. I (1818) 368.— *A. leptanthum* Rchb., l.c., tab. XLIV.— *A. ochranthum* C.A.M. in Ldb., Fl. Alt. II (1830) 285.— *A. lycoctonum* var. *barbatum* Rgl. in Bull. Soc. Nat. Mosc. XXXVI, No. 3 (1861) 77.— ? *A. borzaeanum* Prod. in Bul. Grad. Bot. Cluj. V, Nos. 1–2 (1925) 44.— Ic.: Rchb., l.c., tab. XLIV et XLVI; Ldb., Ic. pl. Fl. Ross. V, tab. 406 (sub *A. ochrantho* C.A.M.); Prod. in Bul. Gard. Bot. Cluj. VI (1926) tab. I (sub *A. borzaeano* Prod.).

Perennial; stem erect, subcylindric, 50–120 cm, appressed-downy, rarely almost smooth; base of stem and petioles covered with sometimes

spreading or retrorse hairs; leaves 6–10 cm long, orbicular or reniform, 10–16 cm broad, with short hairs above and longer hairs beneath (denser along the veins), the leaves pedately 3–5-sect, their segments deeply parted into broadly or narrowly lanceolate dentate lobules, frequently with falcately curved tips; radical leaves 2 or 3, long-petioled, cauline leaves also 2 or 3; inflorescence a simple 8–25 cm long raceme, sometimes branching proximally; flowers sulfur yellow, longer than pedicels, pedicels with 2 filiform bracteoles at base or in lower half; hood covered on the outside with a minute down, conical-cylindric, 16–24 mm high, 2–3 mm broad in upper part, 4–5 mm broad in middle part, 10–11 mm broad at level of beak, the lower margin ciliate; lateral tepals rounded-ovate, 8–10 mm long, 7–9 mm broad, on the outside pubescent in middle part, glabrous-margined, on the inside with a tuft of yellow hairs at outer margin, the hairs protruding from the rictus; lower tepals slightly unequal, 8–9 mm long, 2–3 and 3–4 mm broad, respectively, on the outside densely pubescent, on the inside glabrous or with a tuft of long hairs at outer margin, margins of tepals long-ciliate; nectaries erect, the spur short, obtuse, straight or slightly curved, the lip slightly emarginate; filaments glabrous, rarely ciliate at the middle; pistils 3, downy, like the 3 follicles; seeds triquetrous, with one scarious longitudinal wing, transverse-rugose with pellucid-scarious scales on the wrinkles. June–August. (Plate XIII, Figure 6).

Dry-valley meadows, gravelly and stony slopes, and occasionally rather sparse coniferous and mixed forests, mainly on southern slopes. — W. Siberia: Ob, Irt., Alt.; E. Siberia: Yenis., Lena-Kol., Ang.-Say., Dau.: Far East: Ze.-Bu. **Gen. distr.:** Mong., Jap.-Ch. Described from Siberia. Type in London.

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14. *A. kirinense* Nakai in Rep. first scient. exped. to Manchoukuo, sect. IV, (1935) 147. — *A. barbatum* forma Maxim., Prim. Fl. Amur. (1859) 24. — *A. barbatum* Kom. in A. H. P. XXXII (1904) 249 p.p.

Perennial; rootstock a simple or branched taproot, dark grayish brown; stem to 1 m or more, in lower part glabrous or covered with long distant hairs, in upper part the hairs small and falcate; radical leaves long-petioled (to 30 cm), to 12 cm long, 15–20 cm broad, parted into 3–5 broad-rhombic lobes varying greatly in breadth; middle lobe 4–8 cm broad in its undissected part, each lobe of the first order separated into broad (1.5–4 cm) lobules of the second order terminating in few large acuminate teeth; leaves dark green above, covered with appressed slightly crisp hairs, paler beneath, glabrous, with hairs confined to the veins; petioles with long white hairs in their upper part; inflorescence a long raceme, branched in its lower part; flowers pale yellow or yellow, on the outside with small crisp hairs; hood 15–25 mm high, 10–13 mm broad at level of beak; lateral tepals orbicular, 7–10 mm long, 6–8 mm broad, on the outside pubescent in middle part, on the inside with a tuft of long hairs at outer margin; lower tepals unequal, 6–7 mm long, 2–3 and 4–5 mm broad, respectively, on the outside pubescent, on the inside glabrous or with a small tuft of hairs at outer margin, the tepals ciliate-margined; filaments broadened toward base, with or without teeth; pistils 3, glabrous. July–September.

Forest meadows and rock fissures in oak forests. — Far East: Ze.-Bu., Uss. **Gen. distr.:** Jap.-Ch. Described from Kirin Province. Type in Tokyo.

15. *A. lasiostomum* Rchb., III, spec. Acon. generis (1823–1827) 49; Syreishch., Fl. Mosk. gub. II (1907) 141; Gayer, Vorarbeiten zur Monogr. der europ. Acon.-Arten in Mag. Bot. Lapok VIII (1909) 316. — *A. pallidum* Rchb., l.c., tab. 50; Petunnikow, Ser. Bot., fasc. XIII (1896) 54; Rapaics, Syst. Ac. gen. in Növen. Közlem. VI (1907) 147. — *A. myoactonum* Rchb., l.c., 51. — Ic.: Rchb., l.c., tab. 49 et 50 (sub *A. pallido*); Syreishch., l.c., 141; Maevskii, Fl. Sr. Ross. (1933) 339. — Exs.: HFR No. 205 (sub *A. pallido* Rchb.).

206 Perennial; stem erect, 1–1.5 m, rarely higher, slightly costate proximally, covered with very short crisp, rarely longer straight slightly appressed velutinous hairs; radical leaves 2–4, with long (12–25 cm) glabrous or pubescent petioles, the leaf blade 7–10 cm long, 14–20 cm broad, firm, somewhat coriaceous, with sparse appressed hairs or glabrate above, the hairs denser beneath especially along the veins; the blade 3–5-palmatipartite, its lobes broad, cuneate, considerably diverging, not often and not deeply incised, with short teeth; cauline leaves similar but with shorter petioles or sessile; inflorescence a compact (20–35 cm long) raceme, branched proximally; pedicels mostly short (3–5 mm), somewhat elongating in fruit, covered with short appressed hairs, with 2 small bracteoles in upper half or at middle or rarely in lower half; flowers rather large, yellowish; hood covered with short crisp hairs, high, conical, clavate at end of flowering, with a curved apex, without, rarely with a concavity above the beak, 15–20 mm high, 3–5 mm broad in middle part (when dry), 7–10 mm broad in lower part; middle tepals half-hidden in hood, orbicular (7 × 7 mm), on the outside pubescent in middle part, on the inside glabrous, at outer margin densely long-barbate, only slightly shorter than tip of hood and lower tepals, the latter unequal, ca. 7 mm long, 1.5–2 and ca. 4 mm broad, respectively, on the outside pubescent, on the inside glabrous, largest tepal with an axillary tuft of yellow hairs; nectary with a slender straight claw and a slender semispirally curved spur, the lamina with a smallish emarginate lip at its tip; filaments glabrous, mostly with 2 teeth at the middle; pistils 3, densely covered with accumbent hairs. June–August.

Mountainous shrub-covered localities, forest margins, gullies, and slopes. — European part: Lad.-Ilm. (introduced, very rare), U. V., U. Dnp., M. Dnp., V.-Don, Bl., Crim., L. Don. Endemic. Described from the vicinity of Medyn in the former Kaluga Province. Type in Leningrad.

16. *A. krylovii* Steinb. in Addenda VI, p. 558. — *A. lycoactonum* Kryl., Fl. Zap. Sib. V 1153, non L. — *A. pallidum* C.A.M. in Ldb., Fl. Alt. II (1830) 28, non Rchb.

209 Perennial; rootstock covered with black root fibers; stem 50–130 cm high, simple, costate, leafy, in lower part covered like the petioles with mostly long spreading hairs, in upper part usually more densely covered with short (sometimes yellowish) spreading hairs; radical leaves 6–10 cm long, 12–20 cm wide, often not persistent until flowering; radical and cauline leaves cordate-pentagonal or reniform-pentagonal in general outline, 3–5, rarely 7-pedatipartite, the broad lobes with smallish shallowly incised teeth, lobular margins usually not touching; leaves dark green, covered with very conspicuous simple appressed white or yellowish hairs



PLATE XIII. 1 - *Aconitum ranunculoides* Turcz., a) habit, b) hood, c) nectary, d) gynoeceium, e) stamen, f) part of stem in inflorescence; 2 - *A. umbrosum* (Korsh.) Kom., a) flower, b) hood, c) nectary, d) stamen; 3 - *A. sukaczewii* Steinb., a) flower, b) hood, c) nectary, d) stamen; 4 - *A. excelsum* Rchb., a) flower, b) hood, c) nectary, d) stamen; 5 - *A. apetalum* (Huth) B.Fedtsch., a) flower, b) hood, c) nectary; 6 - *A. barbatum* Pers., root.

above, gray-green beneath, with denser long hairs along the veins; the leaf margins with straight cilia; inflorescence a terminal raceme of medium width, sometimes branching proximally; flowers bright yellow; hood cylindric, with straight yellow hairs on the outside, 12–20 mm high, 3–4 mm broad in upper and middle parts, 10–12 mm broad at level of beak; lateral tepals 9–10 mm long, 8–9 mm broad, ovate-rounded or slightly oblique, on the outside pubescent in middle part, on the inside glabrous with a tuft of yellow hairs at outer margin protruding from the rictus; in fully developed flowers lower tepals attenuate, slightly unequal, 8–9 mm long, 4–5 mm broad, on the outside pubescent in middle part, on the inside glabrous; largest tepal with a tuft of yellow hairs at outer margin; nectary spurs strongly elongated toward apex, slightly hamately curved or scarcely curved, 3–3.5 mm long; filaments glabrous, broadening from the middle, sometimes with lateral teeth; pistils 3, glabrous. July–August.

Rather sparse mountain forests, meadow slopes, and forest meadows; rarely above the timberline. — W. Siberia: Irt., Alt. Endemic. Described from Altai (Kuyum River). Type in Leningrad.

17. *A. monticola* Steinb., sp. nova in Addenda VI, p. 559.

Perennial; stem to 1.5 m, erect, proximally ca. 8 mm thick, slightly costate, simple, branching only in the inflorescence, in lower part glabrous or with small falcate appressed hairs, in the inflorescence with straight distant yellowish hairs; radical and lower cauline leaves with long (to 20 cm) costate petioles, with a pubescence of small appressed hairs; leaf blade orbicular, to 10 cm long, to 20 cm broad, deeply parted into broadly cuneate scarcely overlapping lobes, each lobe deeply cleft into 3 large acute lobules of the second order with few acuminate teeth; leaves glabrous above, with crisp hairs along the veins, rarely pubescent over entire surface beneath; leaf margins with small falcate cilia; inflorescence a terminal raceme to 45 cm long, in upper part many-flowered and dense, peduncles in lower part remote, long; flowers yellow, many times as long or as long or slightly shorter than their pedicels; hood broadly cylindric, covered with straight spreading hairs, 10–15 mm high, 5–6 mm broad in its upper and middle parts and 13–15 mm broad at level of beak, beak strongly produced anteriorly; lateral tepals ovate-oval, 11–12 mm long, 7–8 mm broad, on the outside quite glabrous or pubescent in middle part, on the inside quite glabrous or with very few hairs at outer margin of otherwise eciliate tepals; lower tepals slightly unequal, ca. 10 mm long, 4–5 mm broad, on the outside pubescent, on the inside glabrous, very slightly ciliate-margined; nectary with a short (to 2 mm) clavate slightly curved spur; filaments glabrous, abruptly broadened from the middle, with or without 1 or 2 teeth in middle part; pistils 3, glabrous. June–August.

In river valleys and at the timberline in the high-mountain zone. — Centr. Asia: Dzu.-Tarb. Gen. distr.: Kuldja. Described from the Dzungarian Ala Tau (foothills south of Lepsinsk). Type in Leningrad.

Section 3. *NAPELLUS* DC., Syst. I (1818) 371. — Flowers blue, blue-violet, white, or rarely pale violet with a yellowish tinge, never sulfur yellow; hood not high, sometimes navicular, often remote from lateral tepals at end of flowering; nectary almost always with a curved claw and a capitate or hamately curved spur, rarely without a spur, the spur lamina

more or less inflated, saccate, with a clearly expressed upcurved bilobate lip, the latter sometimes with 2 filiform processes (series *Rotundifolia* Steinb.); follicles 3-7; perianth deciduous.

Series 8. *Variegata* Steinb. — Flowers bicolor; leaves dissected to base.

18. *A. variegatum* L., Sp. pl. (1753) 532; DC., Prodr. I, 59; Rgl. in Index sem. H. Petrop. (1861) 42; Schmal'g., Fl. I, 30. — Ic.: Rchb., III. sp. gen. Acon. (1823-1827) tab. XXXIV.

Perennial; tubers rounded; frequently small tubers also in leaf axils; stems ca. 1.5 m high, simple or with distant branches, glabrous; leaves firm, without pubescence, deeply 5-7-sect, segments rhombic, the cauline leaves less deeply, the radical leaves more deeply incised, with short teeth; inflorescence a loose raceme, flowers singly or in pairs on long pedicels; pedicels glabrous (*lusus a. judenbergense* Rgl.) or pubescent (*lusus b. pilipes* Rgl.); perianth azure or dark blue and white; hood high, campanulate, very distant from lateral tepals, with a small recurved beak; lower tepals lanceolate, recurved; spur spiral, with an almost straight claw; stamens glabrous; pistils 5. August.

Forests and small woods. — European part: M. Dnp. (Podolia). **Gen. distr.:** Centr. Eur. Described from the mountains of the [former] Czech Lands. Type in Linnaean Herbarium.

Economic importance. An ornamental, late-flowering garden plant, occasionally with white flowers. Leaves and tubers poisonous, containing the alkaloid aconitine.

★ 19. *A. stoerkianum* Rchb. in Flora I (1818) 202; Rchb., Uebers. 49; Rgl., Consp. gen. Acon. in Ind. Sem. H. Petrop. (1861) 41; Shmal'g., Fl. I, 30. — Ic.: Rchb., III. sp. gen. Acon. tab. LXXI et Ic. Fl. Germ. tab. 86, f. 4692; Sturm, Deutschl. Fl. II, 6.

211 Perennial; tubers oblong, with numerous small roots; stem ca. 1 m high, rounded, glabrate, leafy; leaves light green, lustrous, long-petioled, cordate-rounded, 7-sect, with coarsely dentate rhombic segments; inflorescence a loose terminal raceme, branched in its lower part, pedicels about as long as flowers; flowers large, violet with a silky sheen, or white with a violet border; hood vaulted with a short upcurved beak; nectaries reaching the very apex of hood, violet, in white flowers with a violet capitate spur and a cordate upcurved lip; filaments pubescent, broadened proximally, with 2 teeth; follicles 3-5, glabrous with violet styles. June-August.

Has long been grown in gardens as an ornamental plant.

Economic importance. Important in medicine, where it is used for the preparation of *Extractum Aconiti*. In Reichenbach's opinion, this is the only species of *Aconitum* for which there are exact medicinal data.

Series 9. *Nasuta* Steinb. — Stems glabrous or only in upper part slightly glandular-pubescent. Hood varying greatly in height, usually with a strongly elongated beak; nectaries with a thickened spur and inflated lamina; follicles 3, glabrous, styles about as long as ovaries. — Caucasus.

20. *A. pubiceps* (Rupr.) Trautv. in A.H.P. VIII (1884) 59; Grossg., Fl. Kavk. II (1930) 103. — *A. nasutum* β *pubiceps* Rupr., Fl. Cauc. (1869) 42. — *A. caucasicum* subsp. *pubiceps* N. Busch in Acta Horti Jurjev. I (1900) 117. — Ic.: Busch, l.c., I, 3, tab. 1, f. a–e.

Perennial; stem 22–100 cm high, simple or branched (*f. ramosum* N. Busch and *f. fastigiatum* N. Busch), slender, often flexuous in upper part, axis of inflorescence and pedicels with straight horizontal hairs (*var. genuinum* N. Busch) with an admixture of glandular hairs, sometimes the hairs crisp and appressed (*var. tuscheticum* N. Busch); leaves parted into attenuate lobes, 0.5–1.5 cm broad, the lobes divided into coarsely dentate lobules of the second order, glabrous on both surfaces, slightly ciliate-margined; inflorescence a short compact terminal raceme, the flowers azure or bright blue; hood to 11 mm high (from basal notch to peak), beak slightly elongated with sparse cilia covered with sparse straight hairs; lateral tepals 18–20 mm long, to 15–16 mm broad, with sparse hairs on the inside and denser small hairs on the outside, ciliate-margined; lower unequal tepals 15–18 mm long, 4–7 mm broad, the largest with long sparse hairs on the inside, the smallest glabrous; all tepals with a minute pubescence on the outside, ciliate-margined; filaments glabrous, gradually broadening toward base; pistils 3, glabrous, follicles 3, glabrous. July–August.

Meadows in the subalpine zone. — Caucasus: Cisc., E. Transc., Dag. Endemic. Described from the Caucasus. Type in Leningrad.

- 212 21. *A. cymbulatum* (Schmalh.) Lipsky in Fl. Kavk. (1899) 213; Grossg., Fl. Kavk. II, 103. — *A. napellus* var. *cymbulatum* Schmalh. in Ber. d. Keutsch. Bot. Gesellsch. X (1892) 285. — *A. napellus* var. *cymbulatum* Shmal'g., Fl. I (1895) 30. — *A. caucasicum* subsp. I *A. cymbulatum* N. Busch in Acta Horti Jurjev. I (1900) 116. — Ic.: Ber. d. Deutch. Bot. Ges. X (1892) tab. XVI, f. 1; N. Busch., l.c. (1900) tab. 1.

Perennial; stem not tall, to 50 cm, rarely more (*var. robustum* N. Busch), simple, quite glabrous; leaves in lower part of stem long-petioled and distant, in middle and upper parts densely covering the stem, parted almost to base into broad-lanceolate cuneate lobes; inflorescence a terminal few-flowered raceme; perianth glabrous, light blue; hood 5–10 mm high, drawn out into a long beak; lateral tepals rounded, 17–18 mm in diameter, with sparse long hairs on the inside, ciliate-margined; lower tepals very unequal, 15–16 mm long, to 3–8 mm broad, glabrous on both surfaces, rather densely ciliate-margined; nectaries on a slightly curved spur with a broadly saccate lamina and a bilobate upcurved lip; filaments glabrous with teeth above the middle; pistils 3, glabrous. July–August.

Meadows in the alpine and subalpine zones. — Caucasus: Cisc., Dag. Endemic. Described from Mt. El'brus. Type in Leningrad.

22. *A. nasutum* Fisch. ex Rchb., Übers. in Flora (1819) nom. nud., descriptio et ic. Rchb., Illustr. spec. Acon. gen. (1823–1827) tab. IX; G. Don, Syst. I, 61 (1831) 56, partim; C.A.M., Verz. Pflanz. Caucas. (1831) 199; Grossg., Fl. Kavk. II (1930) 103. — *A. gibbosum* Sér. Monogr. (1823) 141. — *A. variegatum* Ldb., Fl. Ross. I (1842) 68 (partim); Boiss., Fl. or. I (1867) 95; Suppl. (1888) 21. — *A. caucasicum* ssp. *nasutum* N. Busch in Fl. cauc. crit. III (1901) 79. — Ic.: Rchb.,

Illustr. spec. Acon. gen. (1823-1827) tab. IX. — Exs.: Fl. cauc. exs. No. 8; Herb. Fl. cauc. No. 68.

213 Perennial; tubers rounded, conical, white inside, distally producing many small tubers; in wet weather similar small tubers formed in the leaf axils; stem to 1 m high, rounded, simple (f. *simplex* N. Busch) or profusely branched (f. *pyramidato-ramosum* N. Busch), glabrous from the decurrent petioles, slightly costate, erect, firm, sometimes weak; leaves glabrous, palmately quinquepartite, the lobes lanceolate acute, acutely and remotely serrate; inflorescence a long loose raceme; peduncles as long as or 2-3 times as long as flowers, bracteoles linear; flowers relatively large, pale azure or violet; hood glabrous, ciliate-margined only at beak, to 25 mm high (*gigas* N. Busch); lateral tepals orbicular, 20-22 mm long, 18-20 mm broad, glabrous on both surfaces, eciliate; lower tepals very unequal, 20-22 mm long, to 5 and 8 mm broad, respectively, glabrous, eciliate; nectary with straight claw, spur semispirally curved, middle part of lamina broadened, saccately convex, with bilobate lip; filaments glabrous, gradually broadening toward base, anisiformly crowded in upper part [of receptacle]; pistils 3, glabrous. July-August.

Forest margins. — Caucasus: Cisc., E. Transc. Endemic. Described from the Caucasus. Type in Leningrad.

Note. The transitions between *A. cymbulatum* (Schmalh.) Lipsky and *A. nasutum* Fisch. are frequently so gradual that particular specimens may be referred to either species.

Series 10. *Volubilia* Steinb. — Plants with more or less pubescent, twining or flexuous stems; perianth pubescent on the outside; petioles ciliate above. Pistils 3-5.

23. *A. volubile* Pall. ex Koelle, Spicil. Acon. (1788) 21; C.A.M. in Ldb., Fl. Alt. II, 281; Ldb., Fl. Ross. I, 68; Kryl., Fl. Zap. Sib. V, 1150. — *A. tortuosum* Willd., Enum. hort. Berol. (1809) 576. — *A. cillare* α *oligotrichum* DC., Syst. I (1818) 378. — *A. sezukini* Turcz. in Bull. Soc. Nat. Mosc. (1840) 61. — *A. volubile* Pall. v. *latisectum* Rgl. in Ind. sem. Hort. Petrop. (1861) 43; Kom. and Alis., Oprod. rast. Dal'nevost. kr. I, 535. — Ic.: Rchb., III. Spec. Ac. tab. XXV.

Tubers ovate to fusiform, 1.5-2.5 cm long, 0.5-1.3 cm thick; stem twining or flexuous only in upper part, 45-115 cm, in twining specimens to 4 m high, glabrous or with a slight pubescence (α *oligotrichum* DC.); leaves 3-9.5 cm long, 5-15 cm broad, 3-5-sect to base, almost compound, the lobes ternately or pinnately cleft into linear-lanceolate or ovate-lanceolate (var. *latisectum* Rgl.) entire or dentate lobules, the primary lobes sometimes petiolulate; flowers blue (2-3 cm long), in a raceme or a loose whorl 12-20 cm long; hood rounded-conical, somewhat higher (15-18 mm) than broad; nectaries with straight or slightly curved claws, strongly broadened, saccate, distally rounded, with a short subterminally bent obtuse spur; filaments smooth; pistils 5, rarely 3, glabrous or pubescent; seeds compressed-triangular, ribs with a broad pellucid-scarious frequently crenate or incised border.

Forest zone: forests, forest margins, bottomland deciduous forest, tall herbaceous vegetation, dry-valley and floodplain meadows, and bog margins; also encountered in adjacent parts of the steppe zone. — W. Siberia: Irt.,

Alt.; E. Siberia: Yenisei, Ang.-Say., Lena-Kol., Dau.; Far East: Uss.
Gen. distr.: Mong., Jap.-Ch. Described from Siberia. Type in London.

24. *A. villosum* Rchb., Uebers. (1819) 39; C. A. M. in Ldb., Fl. Alt. II, 282; Ldb., Fl. Ross. I, 68. — *A. ciliare* β *polytrichum* DC., Syst. I (1818) 378. — *A. flaccidum* Rchb., Uebers. (1819) 39 nom nud. — *A. volubile* var. *villosum* Rgl. in Ind. sem. Hort. Petr. (1861) 43; Kryl., Fl. Zap. Sib. 1150. — Ic.: Rchb., III. Sp. gen. Ac. (1823–1827) t. XXVI.

214 Perennial; root tuberous, not large; stem erect, rarely somewhat twining or flexuous in upper part, rounded, to 2 mm thick, in upper part rather densely covered with distant hairs (β *polytrichum* DC.), in lower part mostly glabrous; leaves pentagonal in general outline, to 2.5 cm long, to 4–5 cm broad, dissected to base into linear-lanceolate or sublinear lobes 1.5–7 mm broad with more or less slender hairs; petioles densely pubescent in upper part; inflorescence a sparsely flowered thyrs; pedicels pubescent, bracteoles linear, ciliate; flowers to 2.5 cm long, to 1.5 cm broad, violet, minutely pubescent, rarely glabrous; hood rounded-conical, 1.5–2 cm long to 1.5 cm broad at level of beak, 1–1.5 cm high, generally with a retrorse beak; lateral tepals orbicular, ca. 1 cm in diameter, with long hairs on the inside, ciliate-margined, the lower tepals unequal, broad-lanceolate or oval, to 1.2 cm long, 0.7 cm broad; nectaries on straight or slightly curved claws with a small capitate spur, a strongly saccately broadened lamina (to 3.5 mm broad) and a smallish emarginate lip; filaments glabrous, broadened in lower part, edentate; pistils 5, pubescent. July–August.

Forest zone: forests, dry-valley, and floodplain meadows, bottomland deciduous forest, and tall damp herbaceous vegetation. — W. Siberia: Ob, U. Tob., Irt., Alt.; E. Siberia: Ang.-Say., Lena-Kol. Gen. distr.: Mong. Described from Altai. Type in Vienna.

Series 11. *Arcuata* Steinb. — Plants with arcuate pedicels.

25. *A. fischeri* Rchb., III. spec. gen. Acon. (1823–1827) tab. XXII; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 118 (α typicum); Rgl. in Bull. d. nat. d. Mosc. XXIV, 3 (1861) 93 (α typicum); Finet et Gagnepain in Bull. Soc. Bot. France 51 (1904) 514; Nakai in Bot. Mag. Tokyo 31 (1917) 221 et 229; Hultén, Fl. Kamtsch. II, 106; Kom., Fl. Kamch. II 124. — *A. lubarskyi* Rchb., l. c., tab. XX; Spreng., Syst. II (1825) 621; Ldb., Fl. Ross. I, 70. — *A. japonicum* var. *fischeri* Rapcs. in Növen. Közl. VI (1907) 160. — Ic.: Rchb., l. c., tab. XXII; ibid l. c. XX (sub *A. lubarskyi*); Bull. Soc. Nat. Mosc. l. c., tab. III; Kom., Fl. Kamch. II, pl. XII; Kom. and Alis., Opred. rast. Dal'nevost. kr., pl. 163 (sub *A. raddeano* Rgl.).

Perennial; tubers subconical, producing new tubers by the fall; stem 1–1.6 m, erect, rounded, stout, only occasionally with a twisting tip (f. *subvolubile* Kom.), glabrous, sometimes with scarcely discernible hairs in the inflorescence; leaves deeply palmately cleft into 5–7 lobes, firm, sometimes coriaceous, lower leaves to 8 cm, upper 1–4 cm long, the

lobes approximate, cuneately oboval with large acute teeth, the middle lobe 3–4 cm broad in its undissected part; leaves glabrous on both surfaces with scant small crisp hairs along the veins, ciliolate-margined; inflorescence a loose usually simple raceme, (light-colored form with a compact raceme – *f. pratense* Kom.); lower pedicels (sometimes to 20 cm) arcuate, from axils of upper leaves, the pedicels abbreviated above, the terminal flowers approximate; pedicels about as long as the flowers, glabrous, apically thickened, mostly with 2 linear sometimes leaflike bracteoles about their middle; flowers bright blue, rarely white (*f. albi-florum* Kom.), glabrous; hood turbinate-cupola-shaped, 2–2.4 cm long, 1.5–2 cm broad, to 1.5–1.8 cm high at level of elongated median beak; middle tepals oblique, thin, ciliate, ca. 1.5 cm long, 1.5–1.7 cm broad; lower tepals lanceolate, unequal, 1.4–1.8 cm long, 2.5–4 mm and 5–7 mm broad, respectively; nectaries on an almost straight claw, the lamina broadly inflated, to 8 mm long, to 5 mm wide; spur short (1–1.5 mm), capitate, slightly curved, with a short upcurved lip (ca. 1 mm long and as wide); filaments glabrous, broadened from the middle; pistils 3, glabrous, the ventral surface slightly pubescent. July–September.

Riverside forests on alluvium, often forming large groups; in clearings more rarely birch and alder forests, and even more rarely herb-covered slopes. – Far East: Kamch., Sakh. **Gen. distr.:** Jap.-Ch. Described after specimens from Kamchatka in Pallas's herbarium. Type in London.

Note. Widely distributed in Kamchatka; its poisonous properties are well known.

26. *A. arcuatum* Maxim., Prim. Fl. Amur. (1859) 27; Freyn in Oest. Bot. Ztschr. LI (1901) 382; Nakai in Bot. Mag. Tokyo XXVIII (1914) 61; Kom. and Alis., Opred. rast. Dal'nevost. kr. II, 536. – *A. fischeri* Kom. in Fl. Manchzh. II (1904) 255, non Rchb. – *A. fischeri* α *arcuatum* Rgl. in Ind. sem. Hort. Petr. (1861) 44; Rgl. in Bull. Soc. Nat. d. Mosc. XXXIV, 3 (1861) 118 et 99 – Ic.: Rgl. in Bull. Soc. Nat. d. Mosc. XXXIV, 3 (1861) tab. III. – Russian name: akonit izvilistyi [flexuous].

Perennial, closely related to the preceding, from which it is distinguished by the following characters: stem ascending, flexuous, sometimes slightly twining in the inflorescence, more rarely erect; leaves thin; inflorescence a very loose whorl, (as it were) irregularly branching from the arcuate peduncles and pedicels; flowers frequently recurved; nectaries on a slightly arcuately curved claw, the spur longer (to 3.5 mm long), hamate, with a longer (to 1 cm), narrower (to 3 mm) lamina, and a larger lip (to 2 mm long and as wide). July–September.

Valley forests. – Far East: Ze.-Bu., Uss. **Gen. distr.:** Jap.-Ch., Manchuria (Korea). Described from the lower Amur River. Type in Leningrad.

27. *A. raddeanum* Rgl. in Ind. Sem. Horti Petrop. (1861) 43; in Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 88 et 117; Kom., Fl. Manchzh. II, 254. – Ic.: Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) tab. IV.

Perennial; stem to 1 m high, slightly twining, distally branched; stem, leaves, and pedicels glabrous, the leaves and pedicels rarely ciliate; leaves to 10 cm long, to 15 cm broad, pentagonal in general outline, dissected to base

into 5 rhombic-oval sessile or petiolulate segments, the middle segment parted into 3, the lateral into 2 lobules of the second order with large acuminate teeth; inflorescence a loose raceme; flowers violet, usually recurved; pedicels with leaflike bracts frequently arcuately arising from stem; hood rounded-conical, very distant from lateral tepals, 20–23 mm long, 12–15 mm broad at level of smallish upcurved beak, 13–14 mm high; lateral tepals oblique, 14–15 mm long, 9–11 mm broad; lower tepals attenuate, 10–12 mm long; nectary with a hamately curved spur and a long lamina; filaments glabrous; pistils 5, glabrous.

Shady coniferous and mixed forests, scrub. — Far East: Uss. Gen. distr.: Jap.-Ch. (Manchuria). Described from the Amur River (Mandshuria ad fl. Amur montes Burejae. 1858 Radde). Type in Leningrad.

Series 12. *Maxima* Steinb. — Robust strongly pubescent plants with large tripartite leaves, and short compact raceme; stem with rufous hairs.

28. *A. maximum* Pall., ex DC., Syst. I (1818) 380; Ldb., Fl. Ross. I, 69; Rchb., III sp. gen. Acon. XVII; Rapaics in Növen. Kőzlem. (1907) 159; Nakai in Bot. Mag. Tokyo 31 (1917) 221 et 229; Kom., Fl. Kamch. II, 122; Hultén, Fl. Kamtch. II, 107. — *A. kamtschaticum* Willd. in Rch., III gen. Aconit. (1827) XV et XVI; Ldb., Fl. Ross I, 69; Rgl., Pl. Radd., 96; Yabe et Yendo, Fl. Shimushu, 182; B. Fedtsch., Fl. il. Comm., 37. — *A. gibbiferum* Nakai in Bot. Mag. Tokyo 31 (1917) 221 et 227. — Ic.: Rchb., III. sp. gen. Ac. (1823–1827) tab. XV et XVI. — Vernacular name: agat.

217 Perennial; rootstock short, torose, with black adventitious roots; stem tall, erect, strong, with rufous retrorse hairs 1–2 mm long, sometimes the stem low and with few flowers (f. *pumilum* Kom.), uniformly leafy, the lower leaves long-petioled, tripartite almost to base, the lateral lobes bipartite, all lobes with large acute teeth, to 1 cm broad; petioles and leaf blade ciliate-margined; leaf blade very variable in shape, linear-lanceolate (var. *kamtschaticum* Raps.) or lanceolate (var. *pallasianum* Raps.) pubescent along the veins beneath; inflorescence a few-flowered straight, usually short compact raceme; pedicels densely pilose, somewhat thickened, dingy violet, rarely dingy pink (var. *hultenii* Ostenf.), to 3 cm long, to 1.5 cm wide, pilose on the outside; hood broad, vaulted, without beak or with a small beak to 2 cm long, 1.5 cm broad and 1–1.2 cm high at level of beak; middle tepals orbicular, large, slightly attenuate, 1.5 cm in diameter; lower tepals ovate-oblong obtuse; nectaries straight, with a hamately curved spur to 3 mm long and 1.5 mm wide, with a saccate lamina to 4 mm broad, and a bilobate lip; stamens glabrous or broadened, with or without teeth; pistils 3–5, glabrous. August.

Birch groves and shrub thickets on the slopes of river terraces. — Far East: Kamch., Sakh. Gen. distr.: Jap.-Ch., N. Am. Described from Kamchatka. Type in Geneva.

Note. A very poisonous plant. According to data in Willdenow's herbarium cited by Reichenbach, this plant is locally used for the extermination of insects. In Petropavlovsk-Kamchatskii, the roots have been found to cause acute poisoning.

Series 13. *Inflata* Steinb. — Plants with strongly inflated nectary lamina.

29. *A. sachalinense* F. Schmidt in Reisen im Amurl. u. Sach. (1868) 107. — Ic.: Miyabe and Miyake, Fl. Sagh. No. 30, tab. (1915) f. 1-7.

Perennial; stem to 1.5 m high, simple, in lower part glabrous, upper part and pedicels covered with short crisp hairs; stem leafy; leaves appressed to stem, short-petioled, dissected almost to base into lanceolate segments, the middle segment with a smallish petiole, the lateral united in pairs; lobes broad-lanceolate, with sparse large teeth, ciliate-margined; inflorescence a loose terminal raceme with many small racemes arising from axils of upper leaves; perianth pubescent on the outside, the lower tepals more strongly pubescent, all tepals ciliate-margined; flowers violet-blue; hood cupola-shaped, its height equal to its width at level of beak (1.8-1.5 cm [sic]); lateral tepals pubescent in middle part, ciliate-margined, somewhat oblique, the lower narrow-lanceolate; nectaries not reaching height of hood, with an inflated lamina, spur attenuate, slightly rounded; filaments pilose; pistils 3, glabrous. July-September.

River valleys. — Far East: Sakh. Gen. distr.: Jap.-Ch. Described from Sakhalin Island. Type in Leningrad.

30. *A. kusnezoffii* Rchb., III. spec. Ac. Gen. (1823-1827) tab. XXI; Ldb., Fl. Ross. I, 69, 470; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 116; *A. kusnezovii* Kom. in A. H. P. XXII (1904) 256; Nakai in Bot. Mag. Tokyo 31 (1917) 221; Maxim., Prim. Fl. Amur. (1859) 27 et 28; Turcz., Fl. baic. dah. I, 82. — *A. gibbiferum* Rchb., l.c., tab. XIX. — Ic.: Rchb., l.c., tab. XXI and tab. XIX (sub. *A. gibbifero*).

218 Perennial; rootstock conical, ca. 3 cm long, 1.5-2 cm broad in upper part; stem rounded, erect, very stout, uniformly leafy, 70-150 cm high; leaves dissected to base into 3 segments, quasi-compound, firm, coriaceous, the blade to 14 cm long, to 20 cm broad; petioles of lower leaves 4-8 cm; segments divergent, cuneate, coarsely dentate, linear-lanceolate or lanceolate, glabrous on both surfaces, sometimes with a slight pubescence along the veins above, margins ciliate; inflorescence a compact raceme or a compressed panicle; bracteoles 2, usually at middle of pedicel; flowers brightly colored, dark blue, or sometimes white; perianth glabrous on the outside or with minute pubescence (visible at high magnification); hood convex, 1.5-2 cm long, 1.5-2 cm broad, at level of beak to 1 cm high, with a horizontally attenuate beak (α typicum) or without such a beak (β ochotense); middle tepals suborbicular or slightly oblique, ciliate, with long hairs on the inside, 1.5-1.7 cm long, 1.2-1.5 cm broad; nectaries straight, lower tepals unequal, 1.4-1.7 cm long, 2-4 and 5-7 mm broad, respectively, the lamina 2.5-3 mm broad, broadly inflated, the spur smallish, hamately curved, the lip large, slightly bilobate, upcurved; filaments glabrous, with 2 teeth at the middle; pistils 5 (rarely 3-4), black, glabrous; style as long as or longer than ovary. July-August.

Meadows, shrub thickets, mountain slopes, and forest margins. — E. Siberia: Lena-Kol., Dau. Gen. distr.: Jap.-Ch. Described from the collections of Kuznetsov, which he gathered on an expedition from Yakutsk to Okhotsk, and according to Reichenbach's data coming from Kamchatka.

31. *A. macrorhynchum* Turcz. in Bull. Soc. Nat. Mosc. XV (1842) 83; Ldb., Fl. Ross. I, 68; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 95; Kom. and Alis., Opred. rast. Dal'nevost. kr. I, 53.— *A. tenuifolium* Turcz. in Bull. Soc. Nat. Mosc. XV (1842) 83.— Ic.: Rgl., l.c., XXXIV, 3 (1861) tab. 3 fl.

Perennial; rootstock in the form of 2 oblong tubers 0.5–3 cm long, and 5 mm thick; stem erect, rarely slightly flexuous in upper part, to 1 m high, slender, 2–3, rarely 4 mm thick, covered with a short down of falcate hairs, especially strongly developed in the inflorescence; lower cauline leaves long-petioled (to 15 cm), usually deciduous before flowering, uppermost leaves subsessile, orbicular, 5–7-sect, the segments narrow, linear, 1–2 mm (rarely 3 mm) broad, or else lanceolate-linear, with recurved margins, glabrate or with very small hairs above, revolute margin and the veins with a slight pubescence beneath; inflorescence a loose raceme frequently branched in its lower part; peduncles obliquely spreading; flowers cornflower blue, covered on the outside with small crisp hairs; hood usually covering lateral tepals at the margins, conoid, somewhat pitted above the beak or unpitted, in developed flowers 1.7–1.9 cm long, 1.3–1.6 cm broad, and 0.9–1.4 cm high; lateral tepals somewhat oblique, frequently revolute-margined, with long hairs on the inside and cilia at the margin, the tepals 1.4–1.6 cm long, 1.4–1.7 cm broad; lower tepals 1.0–1.2 cm long, 0.6–0.9 cm broad; nectary with an almost straight claw, a small curved spur, and an inflated lamina, to 3 mm broad, terminating in a smallish upcurved bilobate lip; filaments glabrous or with isolated hairs in upper part, gradually broadening toward base; follicles 5, with long hairs on dorsal surface. July–September.

Damp meadows and mounds in grassy bogs.— E. Siberia: Dau. (E.); Far East: Ze.-Bu., Uda, Uss. Gen. distr.: Jap.-Ch. (Manchuria). Described from Dauria. Type in Leningrad.

32. *A. jaluense* Kom. in A.H.P. XVIII, No. 6 (1901) 439; A.H.P. XXII (1903) 257; Kom. and Alis., Opred. rast. Dal'nevost. kr. I (1931) 535.

Perennial; stem straight, ascending, uniformly leafy, rounded, 2–3 mm thick, glabrous, often semidecumbent; leaves petiolate, ternate, the middle lobe largest, coarsely dentate, acuminate, grayish green and glabrous beneath, yellow-green above and quite glabrous or with an obscure pubescence of small appressed hairs visible only at high magnification; leaves 8–9 cm long, 7–14 cm broad; branches of inflorescence almost perpendicular to the main axis, the branches and also the 1-flowered pedicels densely covered with long distant rufous hairs; bracts at base of pedicels paired, linear, to 2 mm long, also densely pubescent; flowers 3–3.5 cm long, 1–1.5 cm broad, white, rarely azure, covered on the outside with long straight hairs especially dense in young plants; hood 20–23 cm long, 12–17 mm broad at level of beak and 10–15 mm high, frequently strongly concave above the beak; lateral tepals somewhat oblique, concave and with long hairs on the inside, ciliate-margined, to 13–15 mm long and as broad, lower tepals 10–15 mm long, to 6 and 4 mm broad; nectary with a slightly curved claw and a large strongly inflated lamina, the latter 2.5–3 mm broad, half as long as the claw, terminating in a large cordate lip; spur thick, hamately curved; filaments glabrous, broadened in lower part, with teeth on both sides above the middle; pistils 3, densely pubescent. July–August.

Shrub thickets on river valley slopes. — Far East: Uss. Gen. distr.: Jap.-Ch. Described from the banks of the Yalu River in Korea. Type in Leningrad.

33. *A. sichotense* Kom. in Bull. d. Jard. Bot. Acad. Sc. URSS, XXX, 3-4(1932) 201.

220 Perennial; stem to 70 cm high, strong, erect, somewhat flexuous in upper part, large, densely covered with spreading hairs especially in upper part and in the inflorescence; lower leaves dying off before flowering, upper cauline leaves 8-10, with very short petioles (5-8 mm), pubescent in upper part, ciliate; leaves ternate, 4-6 cm long, 4-9 cm broad, the lateral lobes 3-7 cm long, 2.5-3.5 cm broad, cuneate, coarsely dentate, ciliolate-margined, covered with very small appressed falcate hairs above, with a sparser pubescence of straight hairs beneath, denser along the very prominent veins, the leaves appearing glabrous to the naked eye; inflorescence a terminal raceme or else a compact short or loose oblong raceme; pedicels 2-4 cm, strongly hispid with yellowish hairs; bracteoles to 1 cm long, linear, acute, pilose, generally in middle part of pedicels; flowers dark violet-blue, 2.5-3.3 cm long, 1.5-2 cm broad; hood with an acute elongated beak, 1.8-2.4 cm long, 1.5-2 cm broad at level of beak, and 1.4-1.8 cm high, covered with long straight hairs especially dense on the beak; lateral tepals orbicular, slightly oblique, ca. 1.5 cm long and as wide, with sparse straight hairs on the inside, densely pubescent in middle part on the outside, with a ciliate lower margin; lower tepals unequal, to 1 cm long, 3 and 5 mm broad, respectively, densely pubescent on the outside, with sparse straight hairs on the inside especially at the apex; nectary on a straight claw, with a thickened curved spur (to 2.5 mm long and as broad), lamina strongly inflated, to 5 mm broad, terminating in a smallish bilobate upcurved lip; filaments with sparse long hairs in upper part, gradually broadening toward base, sometimes with obscure teeth; follicles 5, strongly pubescent, divergent when ripe. August.

Herbaceous forest clearings. — Far East: Uss. Endemic. Described from Ded-gora (at the summit, at 1,050 m) in the southern Sikhote-Alin Range — 26 August 1930, I. K. Shishkin, No. 1018. Type in Leningrad.

Series 14. *Ambigua* Steinb. — Nectary lamina 1.5-2 mm broad; stem simple or branched, leaves dissected almost to base, follicles 3-5, always glabrous.

34. *A. ambiguum* Rchb. in Uebers. (1819) 43; C.A.M. in Ldb., Fl. Alt. I, 283; Rchb., Illustr. sp. gen. Ac. (1823-1827) 23; Turcz., Fl. baic.-dah. I, 81. — *A. napellus* β *alpinum*, *A. ambiguum* Rgl. et *b. laxum* Rgl. in Bull. Soc. Nat. Mosc. XXXIV (1861) 103. — Ic.: Rchb., l.c., tab. XXIII.

Perennial; rootstock in the form of 2 oblong tubers 10-25 mm long, 3-4 mm thick; stem 40-90 cm high, ca. 3 mm thick, rounded, lustrous, glabrous like the pedicels, erect, in upper part sometimes slightly twining, occasionally branching sparsely at base of inflorescence; leaves glabrous, green above, 30-60 mm long, 50-90 mm broad, dissected to base into 5-7 cuneate-lanceolate segments with a very prominent midrib, the middle

221 segment 6–9 mm broad in its undissected part, each segment separated into 2–3, 3–5 mm broad lanceolate or linear-lanceolate lobes with acuminate teeth 4–11 mm long and 2–4 mm broad; petioles of lower cauline leaves 4–8 cm, the upper leaves sessile; proximal internodes 6–15 cm long; inflorescence a very loose terminal raceme of 2–9 flowers; flowers violet, 18–26 mm long, 12–15 mm broad, on glabrous peduncles thickening below the flowers and frequently overtopping the flowers; hood hemispheric-conical, 15–20 mm long, 12–16 mm broad at level of beak, and 9–12 mm high, glabrous throughout, with cilia at margins of beak; lateral tepals suborbicular or slightly oblique, 12–15 mm long and 11–15 mm broad, glabrous on the outside, sparsely hairy on the inside, ciliate-margined; lower tepals 10–12 mm long and 3–6 mm broad, thin, glabrous, ciliate-margined; nectaries with an arcuate or straight claw, a smallish (from 1 mm) capitate or hamately curved spur, and a narrow (1–1.5 mm) lamina with an upcurved azure-colored cordate or subentire lip; filaments glabrous, rarely with isolated hairs, broadened in lower part and with teeth in middle part; pistils 3–5, glabrous. July–August.

Meadows and shady thickets on banks of mountain rivers; sphagnum bogs. — E. Siberia: Lena-Kol., Dau. Gen. distr.: Mong. Described from Siberia.

35. *A. flerovii* Steinb., sp. nova in Addenda VI, p. 559. — *A. napellus* γ *paniculatum* Rgl. lus. f. *mosquense* Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 107.

Perennial; rootstock in the form of 2 tubers; stem to 1 m high, glabrous as generally the whole plant, branching only in the inflorescence, uniformly leafy except in lower part of stem, the latter usually glabrous until flowering; leaves petiolate, the blade orbicular, 5–8 cm long and 6–10 cm broad, dissected into 3 segments, the middle segment petiolulate in lower leaves, the segments separated into lobes of the second order 5–7 mm broad with subobtusate teeth; inflorescence a terminal rather loose raceme, the lower flowers with very large leaflike bracts; flowers violet, the hood in developed flowers somewhat distant from lateral tepals, 18–20 mm long, 10–12 mm broad at level of beak, 8–11 mm high, glabrous; lateral tepals oblique, 12–15 mm long and 10–12 mm broad, with long sparse hairs on the inside and glabrous on the outside, ciliate-margined; nectaries slightly curved in upper part, with a slightly curved spur to 2 mm long, a lamina to 2 mm broad, and a smallish upcurved lip; stamens glabrous, broadened in lower part, with or without 2 teeth in the middle; pistils 3, glabrous. August.

222 Bogs and boggy forests. — European part: U. V., M. Dnp. Endemic. Described after specimens collected by M. I. Nazarov in the former Vladimir Province near the village of El'tsa, in a swampy alder forest at the edge of a peat bog. — Beredishino, No. 1003, 1 August 1913. Type in Leningrad.

36. *A. smirnovii* (Sukacz.) Steinb., sp. nova in Addenda VI, p. 560. — *A. napellus* var. *smirnovii* Sukacz. in herb.

Perennial; tubers usually 2 conoid, 2–3.5 cm long, to 1.5 cm broad; stem erect, unbranched, 25–45 cm, glabrate, with short soft distant hairs only in the inflorescence as well as on pedicels; lower cauline leaves with

petioles 5–8 cm long, usually dying off before flowering, upper cauline leaves shorter-petioled and approximate, thus the upper part of stem densely leafy; leaves orbicular, glabrous, with short hairs along the veins above, slightly ciliate, 5–6 cm long, 6–9 cm broad, dissected to base into 5–7 cuneate segments, 4–6 mm broad in their undissected part, these parted into lobes of the first order with lanceolate or linear (2–5 mm broad) lobes of the second order; inflorescence a short (3–7 cm) compact raceme (plants with a less compact raceme – var. *jenisseense* Steinb.), pedicels one-fourth to half as long as flowers; flowers of medium size, dark violet when dry; hood navicular, 1.5–2 cm long, to 1.5 cm broad at level of beak and to 1–2 cm high, at end of flowering somewhat removed from lateral tepals, thus the nectary spurs slightly protruding; middle tepals slightly oblique, 1.2–2 cm long and as broad, glabrous on both surfaces, slightly ciliate; lower tepals to 1.5 cm long and 2–3 and 0.5–0.7 cm broad, respectively, glabrous, slightly ciliate; nectaries curved, on long claws, the latter 3–4 times as long as the lamina; spur capitate, 1–1.5 mm in diameter, the lamina slightly inflated, 2.5–3 mm broad, with a smallish upcurved bilobate lip; stamens glabrous, with 2 lateral teeth, the broadened part of filament exceeding the nonbroadened apical ansiform or hamately curved part; pistils 3 (sometimes 4), glabrous; ovaries longer than styles. July. (Plate XIV, Figure 1, a–g).

Balds in the zone of isolated flag-shaped* larches and stone pines, and in boggy areas. – E. Siberia: Yenisei, Dau. **Gen. distr.:** Mong. Described from the Kumylinskii Bald at the sources of the Kumyl River in the Onon River basin. Type in Leningrad.

37. *A. altaicum* Steinb., sp. nova in Addenda VI, p. 560. – *A. napellus* β *alpinum* Rgl. in Ind. sem. Horti Petrop. (1861) 45 p.p.; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 103 p.p.; Kryl., Fl. Zap. Sib. V, 1149. – ? *A. glandulosum* Rapcs. in Növ. Közl. VI (1907) 152.

223 Perennial; rootstock of 2 tubers, to 2 cm long and to 1 cm thick; stem erect, simple, rounded, in lower part glabrous, in upper part covered with a short down, as also the pedicels; leaves uniformly spaced along the entire stem, short-petioled, contiguous to stem; leaf blade pentagonal in general outline, dissected into 3–5 segments with large subobtusate teeth, dark green above and grayish green beneath, sometimes with recurved margins; inflorescence a simple terminal raceme of dark violet flowers, to 30 cm long and to 1.5 cm broad; hood in fully developed flowers removed from lateral tepals, 1.7 cm long, 1.5 cm broad at level of beak and 0.8 cm high, cuneate-conical, quite glabrous, with a smallish ciliate retrorse beak; lateral tepals orbicular, ca. 1.3 cm across, glabrous on the outside and with long sparse hairs on the inside, margin ciliate; lower tepals to 1 cm long, 0.3–0.5 cm broad, the smallest glabrous on the inside and pubescent on the outside, the largest with sparse hairs on the inside and pubescent on the outside, margins ciliate; nectaries on a strongly curved claw, with a smallish capitate spur (to 1 mm in diameter), a narrow lamina (to 2 mm) and a large upcurved lip; stamens glabrous, gradually broadening toward base; pistils 3, glabrous or slightly pubescent. July–August.

Riverbanks, gently inclined slopes, and meadows in the subalpine zone. – W. Siberia: Alt. Endemic. Described from Altai. Type in Leningrad.

* [Trees with a distinctive flaglike shape due to strong prevailing winds.]

38. *A. baicalense* Turcz. in sched.; descriptio in Addenda VI, p. 561. — *A. napellus* α, β, γ Turcz., Fl. baic.-dah. I (1854) 80. — *A. napellus* γ paniculatum α baicalense Rgl. in Ind. sem. Hort. Petrop. (1861) 45; Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 106. — *A. napellus* δ racemosum b. mongolicum Rgl. in Ind. sem. Hort. Petrop. (1861) 46; Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 114. — *A. napellus* var. mongolicum (Rgl.) Suk. in sched.

Perennial; rootstock in the form of 2 oblong tubers; stem to 1 m, erect, strong, branched, glabrous or in the inflorescence slightly pubescent (var. commune Turcz.); sometimes the stem short, to 40 cm, and then conspicuously pubescent in upper part and the flowers small (var. alpinum Turcz.); leaves gray-green, to 10 cm long, to 12 cm broad, dissected to base into 5 broad-lanceolate segments narrowing proximally, each segment separated into 2–3 lanceolate lobules 4–5 mm broad with rather obtusely acuminate teeth, the middle segment 5–7 mm broad in its undissected part; middle part of stem the most densely leafy; inflorescence a long terminal raceme of large blue flowers longer than pedicels, to 3 cm long, ca. 1.3 cm broad, with an arcuately curved beak; hood in fully developed flowers removed from lateral tepals, ca. 2 cm long, ca. 1.5 cm broad at level of beak, and to 1 cm high, quite glabrous; lateral tepals rounded-triangular, quite glabrous on the outside and with long sparse hairs on the inside, the tepals to 1.5 cm long and as broad; lower tepals unequal, to 1–1.2 cm long, to 0.3 and 0.5 cm broad, glabrous; nectaries with a curved claw, a smallish capitate spur (1 mm in diameter), and a medially inflated lamina (2–2.5 mm broad) terminating in a smallish emarginate lip; filaments with sparse hairs or glabrous, proximally broadened; pistils 3–5, glabrous. July–August.

Steppes, steep narrow ravines, meadows and forests. — E. Siberia: Dau. Gen. distr.: Mong. Described from Transbaikalia. Type in Leningrad.

39. *A. czekanovskyi* Steinb., sp. nova in Addenda VI, p. 562. — *A. napellus* δ racemosum d. sibiricum Rgl. in Ind. sem. Horti Petr. (1861) 46; Bull. Soc. Nat. Mosc. XXXIV 3 (1861) 109.

Perennial; rootstock in the form of 2 tubers; stem 1–1.2 m, erect, simple or else branched in the inflorescence, rounded, in lower part glabrous, the inflorescence and the pedicels covered with short soft distant hairs; internodes long; leaves green, glabrous, the lower with 4–7 cm petioles, the upper short-petioled or sessile; leaf blade pentagonal in general outline, 8–9 cm long, 10–12 cm broad, palmatisect, the segments narrow-cuneate, 1–1.2 cm broad in their broadest part, 2–3-partite, their lobes oblong-lanceolate, 2–3 cm long, 0.3–0.5 cm broad; inflorescence a terminal loose raceme, 15–40 cm long, flowers dark violet; pedicels 2.5–5 cm long; hood ca. 1.5 cm long, at level of beak 1 cm broad, 0.7–0.8 cm high, hemispheric, rounded at the apex, sometimes pitted above the beak; lateral tepals obovate, ca. 1.3 cm long, 1 cm broad, pubescent on both surfaces; lower tepals ca. 1 cm long, 0.2 and 0.5 cm broad, the smallest pubescent on the outside and glabrous on the inside, the largest pubescent on both surfaces; filaments glabrous, with 1 or 2 teeth; follicles 3, glabrous. July–September.

Riverbanks and forests. — E. Siberia: Yenis., Ang.-Say., Lena-Kol., Dau. Gen. distr.: Mong. Described from the Chunya River, a tributary of the Podkamennaya Tunguska River (29 July 1931, A. M. Rubin). Type in Leningrad.

Note. The name *A. baicalense* has been applied by different authors to different species. Here it has been given to specimens identical with those of Turchaninov. It is possible that var. *alpinum* will prove to be a separate species, but due to the unreliability of available material, this point cannot now be clarified.

In view of the abundance of related forms, a thorough field investigation is necessary to elucidate the systematic position of the Daurian plants of the section *Napellus* DC.

Series 15. *Flagellaria* Steinb. — Plants with flagelliform excrescences protruding from the nodes.

40. *A. flagellare* (F. Schmidt) Steinb., comb. nova. — *A. napellus* var. *flagellare* Schmidt, Reisen im. Amurl. u. Sach. in Mém. Ac. Imp. Sc. de St.-Pétersb. VII ser., t. XII, No. 2 (1868) 31.

225 Perennial; rootstock in the form of 2 tubers to 1.5 cm long and to 0.7 cm broad; stem erect or slightly flexuous, 40–60 cm, rounded, glabrous or slightly pubescent with very short hairs, evenly leafy; leaves glabrous on both surfaces, all petiolate, the petioles of lower cauline leaves to 10 cm long; leaf blade orbicular, 4–9 cm long, rarely shorter, 5–12 cm broad, dissected to base into 5 cuneate segments, with acute teeth that greatly fluctuate in length (1–5 cm) and frequently with a denticle in the first pair; long slender runners, to 50 cm, arising from the axils of leaves are frequently a distinctive character of this species; inflorescence a few-flowered terminal raceme, branching at base; flowers pale violet, large, to 4 cm long, to 2 cm broad, on pubescent pedicels, with bracteoles mostly close to flowers; hood cupulalike, with an acuminate beak, shape and height highly variable, even in the same inflorescence, to 2.5 cm long, to 2.5 cm broad at level of beak, 0.7–1.8 cm high, glabrous or with a very scant pubescence; lateral tepals oblique or obliquely rounded, 1.5–1.7 cm long, 1.5–1.8 cm broad, with sparse hairs on the inside, glabrate on the outside; lower tepals to 2 cm long, 0.5–0.8 cm broad, also glabrate; nectaries with a curved claw, spur spirally capitate, to 3 mm long, 1.5 mm wide, lamina connate with and one-third as long as the claw, the smallish lip upcurved and bilobate; stamens glabrous, slightly broadened proximally, pistils 3–5, glabrous. June–July.

Riverbanks in damp coniferous forests. — Far East: Uda, Okh., Sakh. Endemic. Described from the Uda area between the Nemilen and Kerbi rivers (Schmidt, 26 June 1861). Type in Leningrad.

Note. A. N. Krisstofovich's specimens from Sakhalin (1929 collections) completely agree with this species in the structure of the vegetative parts, but are distinguished by a larger hamate spur and recurved pedicels.

Series 16. *Delphinifolia* Steinb. — Plants with simple stems, very large flowers, a navicular hood, and smallish nectaries not reaching apex of hood.

41. *A. delphinifolium* DC., Syst. Nat. I (1818) 380; Ldb., Fl. Ross. I, 70; Chamisso in Linnaea VI (1831) 582; Raps. in Növ. Közlem (1907) 26; Kom., Fl. Kamch. II, 125; Hultén, Fl. Kamtch. II, 105. — *A. napellus* var. *Delphinifolium* et var. *semigaleatum* Ser. in DC., Prodr. I

(1824) 62, 63. — *A. semigaleatum* Pall. in Rchb., Uebers. Ac. (1819) 38, nomen. — *A. paradoxum* Rchb. Mon. Acon. (1820) VII. — *A. productum* Rchb., ibidem. — Ic.: Rchb., Monogr., tab. VIII, tab. X (sub *A. chamissonis* Rchb.).

226 Perennial; rootstock short, oblique, little thickened; stem erect, smooth, to 70 cm, not more than 3 mm thick; leaves several, the lower long-petioled, palmately quinquepartite to base, their lobes with 3–5 large entire teeth, the leaf blade cuneate or lanceolate, glabrous, varying greatly in width and length; inflorescence a loose raceme of 1–7 large, dark blue flowers; axis of inflorescence, outer surface of the perianth, and bracteoles more or less pubescent; hood orbicular, with a falcate rather narrow beak, to 2 cm long, to 2.5 mm broad at level of beak, 1–1.2 cm high; middle tepals very large, rounded-triangular, ciliate, to 2.2 cm long, ca. 2.5 cm broad; lower tepals linear-lanceolate, also ciliate, 2–2.5 cm long, 0.6–1 cm broad; nectaries with a slender curved claw, a short uncurved capitate spur, and a smallish lamina terminating in a small lip with a short notch; stamens white proximally, broadened, edentate; pistils 5, slightly pubescent. July–August.

Alpine meadows. — Arctic: Chuk., An.; E. Siberia: Lena-Kol.; Far East: Kamch. Gen. distr.: Ber., N. Am. Described from Kamchatka. Type in the Lambert Herbarium of Kew.

Series 17. *Ecalcarata* Steinb. — Smallish high-mountain plants with 2 or 3 orbicular leaves to 3–5 cm in diameter; flowers usually 2, pale lilac, with light-colored lateral tepals; spur entirely obsolete.

42. *A. biflorum* Fisch. in DC., Syst. I (1818) 380; DC., Prodr. I, 64; Ldb., Fl. Ross. I, 70; Kryl., Fl. Zap. Sib. V, 1151. — *A. grandiflorum* Fisch. in Cat. Hort. Gorenk. (1808) 77, nomen. — Ic.: Rchb., Monogr. Acon. tab. VII, f. 1; Rchb. III, spec. gen. Ac. tab. 40.

229 Perennial; tubers rounded, the size of peas, dark brown, bearing slender roots; stem erect, rounded, 15–40 cm, glabrous like the leaves and petioles, only in its uppermost part, covered — like the pedicels and bracteoles — with a dense short down of straight distant hairs; cauline leaves 2 or 3, the lower 1 or 2 with long petioles (5–12 cm), the upper leaf sessile or short-petioled; leaf blade orbicular, 3–5 cm across, palmately divided to base into 5 lobes that are 16–25 mm broad at level of beak; lateral tepals rounded-triangular, 13–15 mm long, 10–12 mm broad, glabrous or with very sparse short hairs on the inside; lower tepals subobtuse, broad-lanceolate, to 10 mm long, to 5 mm broad; tepal margins eciliate, rarely slightly ciliate; nectaries small, pale azure, the claw filiform, 10–15 mm long, slightly



PLATE XIV. 1 — *Aconitum smirnovii* Steinb., a) habit, b) lower part of stem with tubers, c) single flower, d) middle and lower tepals, e) nectary, f) stamen, g) part of axis of inflorescence; 2 — *A. zeravschanicum* Steinb., a) inflorescence, b) lower part of stem with tubers, c) single flower, d) middle tepals, e) lower tepals, f) nectary, g) stamen, h) part of axis of inflorescence.

curved, appearing obtusely truncated without a spur, the lamina ca. 1.5 mm broad, lanceolate, entire, with arcuately upcurved apical lip; stamens broadened proximally, with or without 1-6 teeth in the middle, filaments glabrous or ciliate; pistils 3; ovaries pubescent, rarely glabrous, follicles ca. 10 mm long, 4 mm broad, slightly downy or glabrate; seeds subtriquetrous subtriquetrous, sharply ribbed, 2.3 mm long, 1.6-1.5 mm broad. August-September.

Taluses: rare. - W. Siberia: Alt.; E. Siberia: Ang.-Say. Gen. distr.: Mong. Described from Altai. Type in Leningrad.

Series 18. *Rotundifolia* Steinb. - Plants with orbicular glabrous leaves, often with few radical leaves covering lower part of stem with their sheaths, persistent until flowering; leaf blade parted to or below the middle into 5 broadly cuneate lobes; flowers pale lilac, with large yellowish lateral tepals, a navicular hood, an obscure spur, and a lip in the form of 2 short linear excrescences; follicles 5.

43. *A. rotundifolium* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 138; Ldb., Fl. Ross. I, 740; Rgl. in Bull. Soc. Nat. Mosc. XXIII, 86; Rgl., Consp., gen. Acon. in Index seminum (1861) 47; Boiss., Fl. Or. Suppl. (1888) 21. - *A. tianschanicum* Rupr. Sertum tiansch. in Mém. Ac. St. Pétersb. (1869) 38. - Ic.: Ann. Bot. Gard. Calcutta X (1905), tab. 99. - Exs.: H. A. F. M. No. 164.

230 Perennial; rootstock in the form of 2 oblong or rounded tubers to 4.5 cm long, 0.3-0.6 cm broad; stem erect, mostly simple, 12-60 cm, covered throughout with small crisp hairs, sometimes with straight hairs on axis of inflorescence; radical leaves arising from the stem 2-5 cm above the crown, frequently embracing lower part of stem with their sheaths; petioles of radical and lower cauline leaves long (7-15 cm), blade cordate, orbicular, 2-4 cm long, 3-6 cm broad, parted into 5-7 lobes, these parted to the middle into 2 or 3 lobes of the second order terminating in subobtuse apically glanduliferous teeth; leaves glabrous, only the upper cauline pubescent above, on dorsal surface more strongly pubescent along the veins; inflorescence a loose, few-flowered, sometimes proximally branched raceme; flowers 15-20 mm long, 10-13 mm broad, pale lilac, with very prominent dark veins, covered with a minute down on the outside; hood navicular, 16-20 mm long, 5-6 mm broad (when folded); lateral tepals broad-ovate, tapering to base, somewhat undulate-margined, 14-16 mm long, 10-12 mm broad, the lower tepals 5-7 mm long, 4-6 mm broad; stamens glabrous or with isolated hairs distally, broadening proximally; nectary with a twisting pendulous apex, lip in the form of 2 filiform excrescences, from 1 mm long; follicles 5, pubescent or sometimes glabrous. July-August.

Stony slopes in the alpine and subalpine zones. - Centr. Asia: T. Sh. Gen. distr.: Dzu.-Kash. Described from the banks of the Sarkhan River (Ala Tau). Type in Leningrad.

44. *A. zeravschanicum* Steinb., sp. nova in Addenda VI, p. 562.

Perennial; tubers 4-12, fusiform, 1-4(8) cm long, 2-5 mm thick; stem 20-100 cm, erect, rounded, glabrous below, upper part and axis of

inflorescence covered with a down of small soft crisp radical leaves 3–12, arising 1–4(8) cm above the crown, petioles 9–32 cm long, glabrous, with amplexicaul sheath; leaf blade 8–15 cm broad, 4–9 cm long, glabrous on both surfaces, orbicular, with very prominent veins beneath, parted into 5–7 broad rhombic lobes, each lobe cleft to one-fourth or one-third into 3–5 lobes of the second order and terminating in obtuse or rounded glanduliferous teeth; cauline leaves 1 or 2, smaller, more deeply cleft into narrower lobes; inflorescence a loose terminal raceme (28–40 cm long), sometimes branched proximally; flowers pale violet and yellow, with very prominent dark venation, 1.8–2.5 cm long, 1.5–2 cm broad; pedicels 0.5–2 cm long, with 2 filiform bracts at or near their base; perianth with small soft hairs on the outside; hood navicular, 1.5–2.5 cm long, 0.5–1 cm broad, with a yellowish margin; lateral tepals 1.5–2 cm long, 1–2 cm broad, undulate-margined, yellowish; lower tepals to 1 cm long, 0.5 cm broad; spur orbicular, slightly curved, lamina in the form of 2 filiform excrescences to 2 mm long, the claw 7–8 times as long as the lamina; filaments hairy distally, sometimes with isolated hairs on the anthers, rarely filaments glabrous; anthers light or dark greenish; follicles 5, covered with crisp or predominantly straight white hairs, or else pubescent on dorsal surface only, more rarely glabrous. June–August. (Plate XIV, Figure 2, a–g).

Stony alpine meadows in the high-mountain zone and in juniper groves (at 2,710–3,070 m). — Centr. Asia: Pam.-Al. Endemic. Described from Central Asia (N. slopes of the Turkestan Range, Mt. Kurgansk near the sources of the Au-korchegai River; among junipers, at a height of 2,710 m. — 2 August 1934, No. 424, K. Afanas'ev). Type in Leningrad.

231 Section 4. **CATENATA** Steinb. — Plants with rootstocks in the form of a small chain, 8 cm long of long or short connate concoid tubers.

Series 1. **Grandituberosa** Steinb. — Rootstock consisting of rather large tubers, 0.8–2.5 cm in diameter; large plants.

45. **A. talassicum** M. Pop. in M. G. Popov and N. V. Androsov., Rastit. zapovedn. Guralash i Zaaminsk. lesinch. (1936) 8.

Perennial; rootstock in the form of a chain of connate tubers, 10–20 mm across in broadest part, to 20 mm long; stem to 1.5 m, to 8 mm thick at base, rounded or slightly costate, erect, simple or slightly branched only at base of inflorescence, glabrous with some crisp hairs only in the inflorescence, uniformly leafy; all except the uppermost leaves with petioles 4–13 cm long, the leaf blade glabrous on both surfaces, pale green beneath, 7–11 cm long, 10–16 cm broad, rounded-pentagonal in general outline, dissected almost to base into 3–5 cuneate segments, each segment divided into 2 or 3 lobes 1–6 cm long and 0.5–1 cm broad, with large acuminate teeth, the segments 2–3 cm broad in their undissected part; inflorescence a terminal, fairly dense raceme; flowers azure, to 3 cm long, 1.5 cm broad; peduncles and pedicels with a pubescence of small crisp hairs; hood usually removed from lateral tepals and recurved in fully developed flowers, 1.5–2 cm long, with an attenuate beak, to 1.7 cm broad at level of beak, 0.8–1.2 cm high, glabrous except for slight pubescence on

the beak; lateral tepals orbicular, sometimes conspicuously oblique, 0.9–1.2 cm long, 1.5–2 cm broad, glabrous on the outside, with long sparse hairs on the inside, margin ciliate; lower tepals frequently varying greatly in width, the smallest 0.3–0.5 cm broad, 1.2–1.5 cm long, the largest 0.8–1.2 cm broad, 1.2–1.3 cm long; all tepals glabrate on the inside, slightly pubescent on the outside; nectaries with a slightly curved claw, a hamately curved spur 1–2 mm long, and an inflated lamina 2.5–3 mm broad, terminating in a smallish upcurved bilobate lip; filaments broadened proximally, pilose distally, with or without teeth in middle part; pistils 3–4, glabrous or very slightly pubescent. June–August.

Damp meadows and river valleys in the subalpine zone and among thickets of *Juniperus*.— Centr. Asia: Pam.-Al., T. Sh. (W.). Endemic. Described from the Arabik River in the Talass Ala Tau. Type in Alma-Ata.

46. *A. angusticassidatum* Steinb., sp. nova in Addenda VI, p. 563.

232 Perennial; rootstock in the form of tubers; stem to 40 cm, simple, erect, rounded, to 6–7 mm thick at base and in the middle, entirely covered with a minute down of straight white hairs; lower cauline leaves with slightly pubescent petioles, 3.5–5 cm long, the middle cauline leaves on short (1–1.5 mm) but broad (3–4 mm) petioles, the upper sessile; leaf blade to 4 cm long, 4–6 cm broad, orbicular, dissected almost to base into 5–7 cuneate segments, the middle segment 6–10 mm broad in its broadest undissected part, the lateral segments narrower, each segment divided into 2–5 lobes terminating in long subobtuse apically glanduliferous teeth, 1.5–2.5 mm broad; leaves glabrate above with isolated sparse hairs, rather more hair beneath, especially along the veins, margins ciliate; inflorescence a compact terminal raceme; flowers dark violet, 2.6–2.8 cm long, 1–1.4 cm broad; hood slightly pubescent, narrow, with a beak almost perpendicular to back of hood, the latter 17–19 mm high, 10–13 mm broad at level of beak, 3.5–4 mm broad in middle part; lateral tepals suborbicular, slightly oblique, slightly pubescent on the outside, glabrous or with very sparse hairs on the inside, ciliate-margined, 1–1.4 cm long, 1.2–1.3 cm broad; lower tepals unequal, slightly pubescent on both surfaces, ciliate-margined, 1–1.1 cm long, 1.5–3 mm and 3–6 mm broad; nectaries with a slightly curved claw, a smallish capitate spur, and a lamina 2–2.5 mm broad, inflated in the middle and terminating in an upcurved bilobate lip; stamens with pubescent filaments gradually narrowing from base to middle; carpels 3–4, glabrous. June–July.

Riverbanks.— Centr. Asia: T. Sh. (E. of Lake Issyk-Kul'). Endemic. Described after specimens of Krasnov, from the banks of the Sary-Dzhas River. Type in Leningrad.

47. *A. soongoricum* Stapf in Ann. Roy. Bot. Gard. Calcut. X (1905) 141.— *A. napellus* Kar. et Kir. in Bull. Soc. Nat. Mosc. XIV (1841) 375; Kar. et Kir., l.c., XV (1842) 139?— *A. napellus* forma 3 Trautv. in Bull. Soc. Nat. Mosc. XXXIII, 2 (1860) 86.— *A. napellus* β *alpinum* Lus. f. *soongoricum* Rgl. in Bull. Soc. Nat. XXXIV, 3 (1861) 105.— *A. napellus* δ *racemosum* formalobelianum Rgl. et Herder in Bull. Soc. Nat. Mosc. XXXVIII, 1 (1864) 404.— *A. napellus* var. *turkestanicum* B. Fedtsch. in A.H.P. XXIII (1904) 348 p.p.— Ic.: Ann. Roy. Bot. Gard. Calcut. X (1905) pl. 95.— Exs.: H.F.A.M. No. 132 (sub *A. napellus* ssp. *turkestanicum* B. Fedtsch.).

Perennial; rootstock a horizontal beaded chain of large conoid tubers 2–2.5 cm long, 0.7–1 cm thick; stem simple, erect, strong, glabrous (var. *glabrum* Steinb.) or sometimes very densely pubescent in upper part (var. *pubescens* Steinb.) to 70 cm high and to 6 mm thick in lower part; leaves in lower part of stem usually dying off before flowering, all except the uppermost leaves petiolate, the petioles of lower cauline leaves to 10 cm; leaf blade rounded-cordate, 5–9 cm long, 8–12 cm broad, dissected to base into 5 cuneate lobes, each divided into 2–3 broadly or narrowly lanceolate lobules with large teeth to 3 cm long and to 0.6 cm broad, the middle lobe ca. 1.5 cm broad in its undissected part; leaves rigid, quite glabrous on both surfaces, paler beneath; inflorescence a terminal raceme of large violet flowers, 3.5–4 cm long, 1.8 cm broad; pedicels terminally thickened, with 2 narrow-linear pubescent bracteoles; hood in fully developed flowers very distant from lateral tepals, arcuately curved, with a long beak, glabrous or slightly pubescent, to 2 cm long, 1.5 cm broad at level of beak, to 0.9 cm high; lateral tepals rounded-ovate, sometimes slightly oblique, ca. 1.5 cm in diameter, slightly pubescent on both surfaces, ciliate-margined; lower unequal tepals to 1.5 cm long, 0.3–0.6 cm broad, also slightly pubescent on the outside, the largest with long hairs on the inside, the smallest glabrous; nectaries with a slightly curved claw, a large capitate spur, 2 mm long and as wide, and an inflated lamina to 3 mm broad with a smallish upcurved emarginate lip; stamens glabrous or with few hairs distally, broadened proximally; pistils 3, glabrous, frequently only one follicle developing. July–August.

Mountain slopes and riverbanks in the alpine zone. — Centr. Asia: T. Sh., Dzu.-Tarb. **Gen. distr.:** Ind.-Him., Dzu.-Kash. Described from Gilgit. Cotype (?) in Leningrad.

Economic importance. This plant, known as *A. soongoricum* Stapf after the Russian place name [Dzungaria], is also called "the Issyk-kul' root," and locally "Ak-parpi" or "Ugor-Goshun." It is used medicinally, but is strongly poisonous to livestock. It appears that it shares its Russian names as well as its applications with *A. karakolicum* Rapcs. The Kirgiz and Uzbek peoples use the name "parpi" or "kara-parpi" for a black medicinal substance extracted from its roots (B. Fedchenko).

Note. In *A. soongoricum* Stapf the entire range of transitions from quite glabrous to strongly pubescent exists. Thorough field investigations are needed to clarify the taxonomic position of these forms.

48. *A. karakolicum* Rapcs. in Növ. Közlem. VI (1907) 149. — A. winkleri Rapcs. in herb. — *A. napellus* O.A. et B.A. Fedtsch., Consp. Flor. turk. (1906) 23, partim. — *A. napellus* var. *turkestanicum* B. Fedtsch. in A.H.P. XXIII (1904) 349, p.p. — Exs.: Edit. H.B.P. No. 11 (sub *A. napellus* v. *tianschanicum* B. Fedtsch.).

Perennial; rootstock of large tubers 2–5 cm long, 1–1.5 cm thick; stem to 2 m, strong, erect, simple, frequently to 1 cm thick at base, glabrous, in lower part usually leafless by time of flowering, in middle part uniformly and densely leafy; leaves petiolate, the petioles of lower cauline leaves reaching 8 cm, usually all leaves appressed to stem; leaf blade orbicular, to 10 cm long, to 15 cm broad, dissected to base into 5 narrowly cuneate segments, each segment divided into 2 or 3 linear lobes of the second order;

234 middle lobe of the second order separated into lobes of the third order; all lobes of the second and third orders narrow-linear, 1.5–3 mm broad, with reflexed margins; middle lobe 3–5 mm broad in its undissected part; inflorescence a long terminal raceme, sometimes branching in its lower part; flowers when fully developed 2–3 cm long and to 1.5 cm broad, dingy violet when dry; bracts small, adjacent to flower; hood frequently distant from lateral tepals, hemispheric-conical with a smallish beak, with small crisp hairs, ciliate-margined, to 2 cm long, 1–1.5 cm broad at level of beak, and 0.9–1.2 cm high; lateral tepals ovate-rounded, oblique, glabrous on the outside or slightly pubescent in middle part, with sparse long hairs on the inside, ciliate-margined, 1.2–1.4 cm long, to 1.1–1.5 cm broad; lower tepals unequal, 0.8–1 cm long, 3–5 and 1–2 mm broad, the largest with long hairs on the inside, the smallest glabrous, both pubescent on the outside, ciliate-margined; nectaries with an almost straight claw, spur large, 2–3 mm long and 1.5–2 mm broad, lamina hamately curved, slightly inflated (to 3 mm broad) terminating in a bilobate lip ca. 3 mm long and broad; stamens hairy distally, broadened proximally, with or without teeth in middle part; pistils 3, glabrous. June–September.

Open mountain slopes. — Centr. Asia: T. Sh. (E. of Lake Issyk-kul').
Gen. distr.: Dzu.-Kash. Described after Regel's specimens from the Karakol area. Type in Budapest.

Note. Since the author did not indicate the year of A. Regel's collection, it was impossible to locate Regel's karakol specimens, according to which *A. karakolicum* Rapsch. was described in the Herbarium of the BIN.* These were apparently collected in Karakol, on the southeastern shore of Lake Issyk-kul', which Regel visited in 1877, since the herbarium specimens with characteristic narrow-linear appressed leaves are confined to eastern Tien Shan. Field studies are needed to clarify this question in detail.

Series 20. *Brevituberosa* Steinb. — Plants 0.5–1 m high, with beaded rootstock of small tubers, to 5–8 mm long and as thick, frequently bearing roots.

49. *A. saposchnikovii* Fedtsch., sp. nova in Addenda VI, p. 563.

235 Perennial; rootstock a slender chain of smallish connate tubers 5–6 mm long and as broad; stem to 55 cm, 2–3 mm thick at base, rounded, covered with small curved hairs visible only with the aid of a hand lens, the pubescence denser in the inflorescence and mainly of crisp hairs; leaves 3–8, the blade 25–40 mm long, 50–60 mm broad, mostly in lower half of stem, pentagonal in general outline, dissected to base into 5 broadly cuneate segments, these divided into 2 or 3 lobes, with rounded-acuminate teeth, 3–8 mm long, 2–4 mm broad, the middle segment 12–20 mm broad in its undissected part; leaves glabrate on both surfaces, with few hairs along the veins, margin sparsely ciliate-margined; inflorescence a loose few-flowered raceme of 4–8 flowers, violet-blue (when dry) with a white patch at base of lateral tepal, to 28 mm long and to 12 mm broad; hood in fully developed flowers usually strongly curved away from lateral tepals, 14–16 mm long, to 11 mm broad at level of beak, 5–7 mm high, slightly pubescent, glabrate, beak more densely pubescent, ciliate-margined; lateral tepals suborbicular, sometimes slightly oblique, 10–14 mm long, 10–12 mm

* [The Botanical Institute of the Academy of Sciences of the USSR.]

broad, with long sparse hairs on the inside, glabrous or densely covered with crisp hairs on the outside, ciliate-margined; lower tepals very unequal, 9–10 mm long, 1–5 mm broad, glabrate on the inside, pubescent on the outside; nectaries with a slightly curved claw, spur 0.5–1 mm long, and lamina 1–2 mm broad terminating in a smallish upcurved emarginate lip; stamens glabrous, broadening toward base; pistils 3, glabrous. July.

Spruce forests and river valleys. — Centr. Asia: T. Sh. Endemic. Described from the Naryn River gorge between the Imet and Kashka-su rivers (20 July 1913, B. Sapozhnikov). Type in Leningrad.

50. *A. tranzschelii* Steinb., sp. nova in Addenda VI, p. 564.

Perennial; rootstock a beaded chain of smallish connate tubers to 5 mm broad, 6–7 mm long, bearing roots; stem to 70 cm, erect, 3–3.5 mm thick at base, covered with small appressed slightly crisp hairs, sometimes in the inflorescence and on the pedicels with a pubescence of distant hairs; lower cauline leaves borne on petioles 7–15 cm long; leaf blade 3–14 cm long and 5–7.5 cm broad, quite glabrous beneath, with a very slight pubescence above (visible only with a hand lens); the blade ciliate-margined, grayish green, paler beneath, pentagonal in general outline, dissected almost to base into 3–5 broadly cuneate segments, the lower segments convergent or almost convergent or forming an acute angle, each segment cleft to the middle or less deeply into 2 or 3 lobes terminating in large rounded-acuminate teeth; middle segment of lower cauline leaves 20–30 mm broad in its undissected part; inflorescence a terminal few-flowered raceme, with 1–2 branches in its lower part; flowers violet-blue when dry, to 30 mm long and 12 mm broad; hood to 2 cm long and 15–17 mm broad at level of beak, 5–8 mm high, with an acute beak slightly pubescent, more densely pubescent on the beak, in fully developed flowers very distant from lateral tepals; lateral tepals orbicular, slightly oblique, 13–15 mm long and as broad, with long sparse hairs on the inside and a slight pubescence of small appressed hairs on the outside, ciliate-margined; lower tepals very unequal, 13–14 mm long, 2–3 and 6–7 mm broad, respectively, the largest with long sparse hairs on the inside, the smallest glabrous, both covered with small appressed hairs on the outside; nectaries with a curved claw, a smallish capitate spur 0.5–0.75 mm in diameter, and a narrow (to 2 mm) lamina terminating in a smallish upcurved lip; stamens glabrous, broadening toward base, sometimes in the middle part with a tooth on one side; pistils 4–5, glabrous. July.

Slopes and in Juniperus thickets. — Centr. Asia: T. Sh. Endemic. Described from Fergana, in the vicinity of Irkeshtam (21 July 1900, W. Tranzschel). Type in Leningrad.

51. *A. nemorum* M. Pop. in Bull. Soc. Nat. Mosc. XLIV, 3 (1935) 131.

Perennial; rootstock a rather thin chain of connate fusiform or short triangular tubers 1–3 cm long, 5–8 mm thick; stem erect, to 1 m, uniformly leafy almost from the very base, with a sparse pubescence of small retrorse hairs visible only with a hand lens; the axis of the inflorescence and the pedicels more strongly pubescent with distant straight hairs; all except the uppermost leaves petiolate, radical leaves usually dying off before flowering; petioles 0.5–10 cm, glabrous or with hairs scarcely discernible with a hand lens; leaf blade 5–12 cm broad and 3–8

long, pentagonal in general outline, glabrous, margin with very small cilia visible only with a hand lens, the blade dissected almost to base into 5 rhombic segments 2–3.5 cm broad in their broad undissected part, each segment divided into 3 large lobes with large teeth; inflorescence a very loose terminal raceme, proximally with very spreading peduncles (4–6 cm apart), like the pedicels with a pubescence of distant hairs; flowers blue-violet, slightly pubescent on the outside, sometimes recurved; by end of flowering the hood removed from lateral tepals and then the flowers ca. 3 cm long (as measured from tip of lower tepals to apex of hood), ca. 1.5 cm broad; hood 1.5–1.8 cm long, 1.3–1.6 broad, and 0.7–0.9 cm high with a straight beak; lateral tepals suborbicular, 1.1–1.3 cm long, 1.2–1.4 cm broad, ciliate-margined; lower tepals ca. 1 cm long and 1.5 and 2–4 mm broad, respectively; nectaries with a curved claw, a noninflated lamina, a capitate spur, and a slender terminally bilobate lip; stamens glabrous or with isolated hairs, broadened proximally; pistils 3, glabrous. August.

Forests.—Centr. Asia: T. Sh. Gen. distr.: Dzu.-Kash. Described from the vicinity of Alma-Ata. Type in Alma-Ata; cotype in Leningrad.

Genus 526. **ANEMONE*** L.**

L., Syst. ed. I (1735); L. Sp. pl. (1753) 532.

237 Flowers solitary or in cymose, often many-flowered inflorescences, smallish or rather large, with 5–20 tepals of varying shape; stamens more or less numerous; pistils numerous, pubescent or glabrous, with or sometimes without a mostly short straight or curved style with one integument, single ovule pendulous, fruitlets nutlike, of varying shape, glabrous or variously pubescent (see descriptions of the separate subgenera), frequently with various adaptations allowing distribution by wind or more rarely by animals, without a stalk (apophysis). Perennial herbaceous plants with a subterranean, often fleshy, cylindric or tuberous rootstock. Radical leaves sometimes absent but usually with petioles of varying length, the leaf blade mostly palmatisect or palmatipartite; stems or scapes terminal, rarely in axils of lower or radical leaves. Involucral leaves verticillate, occasionally opposite, mostly remote from flowers, herbaceous, sometimes greatly reduced, but never appearing like sepals. Russian name: vetrenitsa.

Economic importance. Most species of *Anemone* are poisonous (in particular *A. nemorosa* L., *A. ranunculoides* L., and species closely related to these, *A. dichotoma* L., etc.). Several species of the subgenus *Anemonanthea* DC., *Eriocephalus* Hook. et Thoms., and *Homalocarpus* DC are ornamental.

- | | | |
|----|---|-----|
| 1. | Radical leaves none or 1(2) | 2. |
| + | Radical leaves more or less numerous and not fewer than 3, forming a rosette | 21. |
| 2. | Involucre of 3 very rarely 2 cauline leaves surrounding the 1 or 2 (–5) simple leafless peduncles | 3. |

* From the Greek *anemos*, wind.

** Treatment by S.V.Yuzepchuk.

- + Involucre of 2 leaves; inflorescence seemingly dichotomously branched, with 2-leaved involucre at each ramification 33. *A. dichotoma* L.
- 3. Radical and cauline leaves shallowly lobed 19. *A. richardsonii* Hook.
- + Radical and cauline leaves dissected to base or almost to base 4.
- 4. Rootstock more or less thickened fleshy; cauline leaves more or less petiolate (sometimes with very short petioles) 5.
- + Rootstock very slender, greatly elongated, producing shoots in the upper part; cauline leaves sessile 19.
- 5. Rootstock creeping, cylindric 6.
- + Rootstock tuberous; flowers blue (Caucasian species) 18.
- 6. Tepals more or less broad, petaloid, divaricate 7.
- + Tepals very narrow, 1–1.5 mm broad, recurved parallel to the pedicels 12. *A. reflexa* Steph.
- 7. Flowers yellow or colored with anthocyanins (very rarely white, but then the plant representing one of the flowering variations of the polychroic species confined to the Urals); tepals pubescent on the outside 8.
- + Flowers white, occasionally pink, but in the latter case the tepals glabrous on both surfaces 11.
- 8. Flowers azure; cauline leaf segments with long acute teeth 4. *A. coerulea* DC.
- + Flowers of a different color, only in very rare cases azure; cauline leaf segments with short or shortish mostly obtuse teeth in upper part 9.
- 9. Cauline leaves with linear-lanceolate segments, these with very few short teeth in upper part or sometimes entire; flowers yellow 2. *A. jenssejensis* (Korsh.) Kryl.
- + Cauline leaves with broader oblong-lanceolate segments, and deeply incised-dentate in upper part with 2–5 large teeth on each side . . . 10.
- 10. Flowers always yellow; cells of the upper epidermis of tepals not papillate 1. *A. ranunculoides* L.
- + Flowers polychroic: rose-red, azure, yellow, white, or of intermediate hues; epidermal cells of the upper epidermis of tepals papillate 3. *A. uralensis* Fisch.
- 11. Cauline leaves with well developed more or less long petioles . . . 12.
- + Cauline leaves with very short often scarcely discernible petioles 15. *A. flaccida* F. Schmidt.
- 12. Tepals usually 5 13.
- + Tepals 6–15 15.
- 13. Cauline leaves with very long petioles half as long as or almost as long as the blade; leaf segments on short petiolules 11. *A. udensis* Trautv. et Mey.
- + Cauline leaves with shorter petioles and with sessile segments . . . 14.
- 14. Cauline leaves with narrow linear-lanceolate or oblong segments, these entire or with few teeth 5. *A. debilis* Fisch.
- + Cauline leaves with elongate-rhombic segments coarsely incised-dentate 9. *A. umbrosa* C. A. M.
- 15. Tepals 6–8 16.
- + Tepals 8–15 17.

16. Cauline leaves with slender petioles. European plants 6. *A. nemorosa* L.
+ Cauline leaves with rather broad somewhat winged petioles. Far Eastern plants 7. *A. amurensis* (Korsh.) Kom.
- 239 17. Stems and petioles of radical leaves glabrous; petioles of cauline leaves scarcely pilose 8. *A. altaica* Fisch.
+ Stems (at least distally) and in particular the petioles of radical and cauline leaves covered with long horizontally spreading hairs 10. *A. raddeana* Rgl.
18. Leaves glabrous or remotely pilose; fruitlets with conspicuous but short curved styles 13. *A. caucasica* Willd.
+ Leaves appressed-pilose above, glabrous beneath; fruitlets with verrucose or almost punctiform style 14. *A. blanda* Schott et Kotschy.
19. Stems and petioles of radical leaves squarrose-pilose; fruitlets pilose 16. *A. baicalensis* Turcz.
+ Stems and petioles of radical leaves glabrous or glabrate 21.
20. Fruitlets glabrous 17. *A. glabrata* (Maxim.) Juz.
+ Fruitlets pilose 18. *A. litoralis* (Litw.) Juz.
21. Rootstock tuberous 22.
+ Rootstock vertical, elongated or short, profusely covered with rootlets 29.
22. Leaf teeth acute; flowers solitary 21. *A. kuznetzowii* Woron.
+ Leaf teeth subobtuse or obtuse; flowers frequently 2 or 3 23.
23. Cauline leaves cuneate with almost winged-petiolate base 24.
+ Cauline leaves broadly sessile 27.
24. All or at least the middle segment of radical leaves with more or less long petiolules 25.
+ Segments of radical leaves sessile or subsessile 26.
25. All 3 segments of radical leaves with subequal petiolules 23. *A. petiolulosa* Juz.
+ Only middle segment of radical leaves with a more or less long petiolule, the lateral segments sessile or on short petiolules 22. *A. bucharica* Rgl.
26. Teeth of middle segment of radical leaves totaling 12-17(-20). Plants from the vicinity of Alma-Ata 25. *A. almaatensis* Juz.
+ Teeth of middle segment of radical leaves totaling 9-13. Tien Shan 24. *A. gortschakowii* Kar. et Kir.
- ++ Teeth of middle segment of radical leaves totaling (5-)7-9(-12). Pamir-Alai 26. *A. oligotoma* Juz.
27. Tepals glabrous on both surfaces 29. *A. serawschanica* Kom.
+ Tepals more or less pilose on the outside 28.
- 240 28. Anthers elliptic or oblong, yellow 27. *A. eranthioides* Rgl.
+ Anthers linear-oblong, mostly purple or violet 28. *A. tschernjaewii* Rgl.
29. Cauline leaves well developed, with conspicuous petioles 30.
+ Cauline leaves more or less reduced, sessile or subsessile 31.
30. Leaves remotely appressed-pilose above, more or less densely appressed-pilose beneath 30. *A. silvestris* L.

- + Leaves glabrous except for ciliate margins 31. *A. ochotensis* Fisch.
31. Involucral leaves 3, distinct; fruitlets pilose 32.
- + Involucral leaves 4, cruciformly arranged proximally; connate fruitlets glabrous 33.
32. Cauline leaves apically trifid; flowers smallish, to 1.5 cm in diameter; fruitlets short-pilose 20. *A. obtusiloba* Don.
- + Cauline leaves tripartite; flowers 2-3.5(-4) cm in diameter; fruitlets covered with long crisp hairs 32. *A. parviflora* Michx.
33. Stems and petioles of radical leaves with accumbent or appressed hairs; tepals more or less pilose on the outside 34.
- + Stems and petioles of radical leaves with spreading hairs or glabrous (only in *A. villosissima* (DC.) Juz. the hairs erect-spreading at first, the tepals glabrous on both surfaces) 35.
34. All segments of palmatisect leaf sessile 36. *A. impexa* Juz.
- + Middle segment of the almost pinnatisect leaf with a more or less long petiolule 38. *A. protracta* (Ulbr.) Juz.
35. Peduncles very short, scarcely elongating after anthesis 45. *A. brevipedunculata* Juz.
- + Peduncles greatly elongating after anthesis 36.
36. Leaves ternate, usually reniform in outline with an axil [sic.] at base; leaf segments sessile, frequently all or only the middle segment petiolulate; tepals mostly glabrous on the outside 37.
- + Lateral leaf segments divided to base, giving leaf a quinate appearance, the segments usually convergent at their outer margins, thus the leaf suborbicular; usually all segments sessile (short-petiolate only in *A. fasciculata*, but then the tepals more or less pilose beneath) 41.
37. Stems and petioles of radical leaves rather sparsely pilose, usually without pubescence, sometimes some petioles glabrate above 38.
- + Stems and petioles uniformly and densely pilose throughout 40.
- 241 38. Caucasian high-mountain plant with polychroic flowers: usually yellow, more rarely white, sometimes pink 46. *A. speciosa* Adams.
- + Siberian and Far Eastern plants with white flowers 39.
39. Leaf segments with conspicuous petiolules 44. *A. sachalinensis* (Miyabe et Miyake) Juz.
- + Leaf segments sessile or petiolules obsolete 42. *A. sibirica* L.
40. All leaf lobes with conspicuous subequal petiolules 37. *A. biarmiensis* Juz.
- + Middle lobe with a conspicuous more or less long petiolule, the lateral lobes sessile or with very short petiolules 39. *A. schrenkiana* Juz.
41. Stems and petioles glabrous or glabrate 43. *A. calva* Juz.
- + Stems and petioles densely pilose 42.
42. Stems and petioles covered with rather short hairs; tepals more or less pilose on the outside 43.
- + Stems and petioles covered with very long hairs; tepals glabrous on the outside 44.

43. Leaves glabrous or glabrate above; leaf lobules frequently arcuately curved 34. *A. laxa* (Ulbr.) Juz.
 + Leaves mostly densely pilose along the veins above; leaf cusps straight 35. *A. fasciculata* L.
 44. Stems and petioles of radical leaves covered with horizontally spreading or reflexed hairs; leaf teeth subacute or acute 40. *A. crinita* Juz.
 + Stems and petioles of radical leaves, at least when young, covered with erect-spreading hairs; leaf teeth obtuse 41. *A. villosissima* (DC.) Juz.

Subgenus 1. **ANEMONANTHEA** DC. Syst. I (1818) 196, p.p. — Fruitlets sessile, glabrous or with short appressed hairs, styles short, not noticeably changing in fruit, or obsolete.

Section 1. **SYLVIA** Gaud., Fl. helvet. III (1828) 490, p.p. — Rootstock horizontally creeping, elongated, more or less slender, yellowish or brownish, usually with much abbreviated internodes, covered with smallish squamose leaves. Radical leaves in flowering plant mostly absent, rarely one. Involucral leaves well developed, resembling radical leaves. Receptacle slightly convex.

Subsection 1. **HYLALECTRYON** Irmisch, Bot. Zeit. (1856) 19. — Tepals normal in habit, divaricate, white, colored by anthocyanin or yellow. Filaments slender.

- 242 1. *A. ranunculoides* L., Sp. pl. (1753) 541; Ldb., Fl. Ross. I, 14; Boiss., Fl. Or. I, 14. — *A. flava* Gilib., Fl. lith. II (1781) 274. — Ic.: Rchb., Ic. Fl. Germ. IV, tab. 47; Hegi, III, Fl. Mitt.-Eur. III, tab. 116. — Exs.: HFR No. 401; Fl. Hung. exs. No. 166; Hayek, Fl. stir. exs. No. 338; Pl. polon. exs. No. 107.

Perennial, 7–22(–30) cm high; rootstock horizontal, creeping, brown, with squamose leaves; radical leaves none or one, long-petioled, trisected into short-petioled segments, the lateral segments bipartite, the trifid middle one with deeply incised-serrate-dentate lobes and lobules and few large subobtuse teeth; stems erect, glabrous or remotely pilose; involucral leaves 3, horizontal, short-petioled, palmately trisected, the segments oblong-lanceolate, deeply incised-dentate distally, with 2–5 large subobtuse teeth on each side, the lateral segments usually bifid (or sometimes almost bipartite); leaf blade with few hairs (mainly along the veins) above, glabrous beneath; peduncles 1 or 2, rarely 3–5, long, covered with soft accumbent or erect-spreading hairs; flowers 1.5–3 cm in diameter, with mostly 5, rarely more, broad-ovate yellow tepals with slender appressed hairs on the outside; tepals with outer walls of cells of upper epidermis more or less convex, not prolonged into papillae; tepals many times as long as stamens; fruitlets 4–6 mm long, short-pilose with a short curved beak. April–May. (Plate XV, Figure 1, a–c).

Forests (mainly broadleaf), forest margins, scrub, parks, and shady grass plots. — European part: Kar.-Lap., Dv.-Pech., V.-Kama, U. Dnp., Lad.-Ilm., U. V., M. Dnp., Bl., V.-Don, Transv., Crim.; Caucasus: Cisc. **Gen. distr.:** Centr. Eur., Scand., Atl. Eur. (absent in England), Med., As. Min. (Taurus Mt.) Tib.? Described from N. Europe.

Hybrid: *A. nemorosa* L. × *A. ranunculoides* L. (*A. seemeni* Camus in Journ. de Bot. (1898) 101. — *A. intermedia* Winkl. ex Pritz. in Linnaea XV (1821) 652, non Schultes. — *A. sulphurea* Pritz., l.c., non Linn. nec All.) with sulfur-yellow flowers is occasionally encountered together with the parent species (published in HFR No. 452a, b, Leningrad).

2. *A. jennisensis* (Korsh.) Kryl., Fl. Sib. Occident. V (1931) 1157. — *A. ranunculoides* subsp. *jennisensis* Korsh., Fl. Vost. Evr. Ross. (1892) 56.

Perennial, 12–29 cm high; stem weak, elongated, glabrous; involucre leaves with petioles 3–5 mm long, trisected into linear-lanceolate segments, the lateral segments sometimes more or less deeply cleft in their lower part, with 1 lobe on the outer side, the middle segments usually entire, in lower half always entire but in upper half with few large subobtusate teeth, rarely also entire, ciliate-margined; peduncles 1 or 2, with a short down; flowers 1.5–2.5 cm in diameter; tepals 5, ovate or elliptic, yellow, with a very short down on the outside, their [upper] epidermal cells frequently prolonged into papillae. In other characters the plant resembles *A. ranunculoides* L. From second half of May through June.

Coniferous (pine or spruce-and-fir), mixed, broadleaf (birch) forests, forest margins, damp forest meadows, and margins of sedge bogs. — W. Siberia: Ob (westernmost finds in the former Mariinsk County on the southern slopes of the Archi Ridge, opposite the village of Borovaya), Yenisei (S. of 68.5° N. lat), Ang.-Say. ([former] Nizhne-Udinsk County, environs of Irkutsk, etc.). Endemic. Described from various sites along the Yenisei River. Type in Leningrad.

3. *A. uralensis* Fisch., ex DC., Prodr. I (1824) 19; Ldb., Fl. Ross. I, 14. — *A. ranunculoides* subsp. *uralensis* Korsh., Fl. Vost. Evr. Ross. I (1892) 57. — *A. coerulea* var. *uralensis* Korsh., Tent. Fl. Ross. Or. (1898) 6. — *A. coerulea* × *ranunculoides* Korsh. in Bot. Centralbl. XLII (1890) 387–393. — Ic.: Korsh., l.c. (1892) tab. 1. — Exs.: Dörf. Herb. norm. No. 4421.

Perennial, closely resembling *A. ranunculoides* but distinguished from it by the somewhat narrower lanceolate leaf segments, particularly by the color of the tepals (rose-red, white, more rarely azure, yellow, or of intermediate hues), and also by the papillate [upper] epidermal cells of the tepals. On the other hand, forms with azure flowers closely resemble *A. coerulea* DC., from which they are distinguished by the different type of leaf dentation: for in *A. uralensis* the teeth are usually subobtusate or rounded, as in *A. ranunculoides* L.

Scrub, banks of mountain streams, floodplain meadows, and meadow moors. — European part: V.-Kama (Bilimbai, Krasnoufimsk, etc.). Endemic. Described from the Ural Mountains. Type in Geneva.

4. *A. coerulea* DC., Syst. I (1818) 203; Ldb., Fl. Ross. I, 14; Kryl., Fl. Zap. Sib. V, 1157. — *A. incisa* Ldb., Ind. sem. Hort. Dorp. (1824). — *A. fischeriana* DC., Prodr. I (1824) 20. — *A. ranunculoides* subsp. *coerulea* Korsh., Fl. Vost. Evr. Ross. (1892) 56. — *A. coerulea* var. *typica* Huth in Bull. Herb. Boiss. V (1897) 1073. — *A. coerulea* subsp. *typica* Ulbr. in Engl. Bot. Jahrb. XXXVII (1906) 217. — Ic.: Deless., Ic. select. I (1820) tab. 14.

244 Perennial, 10–20(–25) cm high; rootstock creeping, cylindric, somewhat grayish brown; stem erect, glabrous; involucre leaves 3, with short (3–5 mm) broadened slightly pilose or glabrate petioles, the leaf blade 5–6 times as long as the petiole, trisected to base into oblong or linear-lanceolate narrow acute segments, the lateral segments bipartite, the trifid middle one incised-dentate in upper part with 3–5 more or less long acute teeth on each side that are often falcately curved on the outside; leaf blade with short-ciliate margin, pilose beneath; peduncle 1(2), much shorter than involucre leaves, covered with appressed or erect-spreading flowers smallish, 0.8–2.5 cm in diameter; tepals 5, ovate or elliptic, very obtuse, divaricate, azure, appressed-pilose beneath; upper epidermal cells of the tepals papillate; fruitlets pilose with an apically recurved beak. End of April to beginning of June.

Sparse coniferous, broadleaf, and mixed forests and their margins, scrub, forest meadows, sometimes floodplain meadows. — W. Siberia: Irt., Ob., Alt.; E. Siberia: Ang.-Say. Endemic. Described from Siberia "circa Zmeef" (Patrin). Type in Geneva.

5. *A. debilis* Fisch. ap. Turcz. in Bull. Soc. Nat. Mosc. XXVII, 2 (1854) 274; Kom., Fl. Penins. Kamtsch. II (1929) 130. — *A. ranunculoides* β *gracilis* Schlechtd. in Linnaea VI (1831) 574. — *A. coerulea* β *gracilis* Ldb., Fl. Ross. I, 14. — *A. linearis* Schlechtd. (pater) in Herb. Willd. — *A. gracilis* F. Schmidt in Mém. Ac. Sc. Pétersb. VII sér.; tab. XII, No. 2 (1868) 102. — Ic.: Miyoshi et Makino, Pock.-Atl. Alp. Pl. Jap. II (1907) tab. 37, fig. 207.

Perennial, rootstock shortish, rather slender; radical leaves solitary, long-petioled, trisected into obovate-rhombic or broad-obovate very obtuse ciliolate-margined segments that are otherwise glabrous or pilose above; these 2–3-fid, cuneate distally, with few (5–10) large obtuse apiculate teeth with mucro; stems solitary, rarely 2, erect, slender, remotely pilose or glabrous; involucre leaves short-petioled, trisected to base into linear-lanceolate, lanceolate, oblong subacute or obtuse segments, these entire or in larger specimens with few large teeth; peduncles solitary, short, erect, slender, pilose above; flowers small, 0.8–1.6 cm in diameter, nutant; tepals 5(6), oblong-elliptic, obtuse, white, greenish on the outside, glabrous; pistils pilose; fruitlets ovate, acute, with somewhat curved but distally straight (not hamate) styles. Second half of May, June.

247 Coniferous forests, forest margins, scrub, and dry herb-covered slopes. — Far East: Kamch., Ok., Uda, Sakhalin. **Gen. distr.:** N. Japan. Described from near Tigil' in Kamchatka and also from the Kurile Islands. Type in Leningrad.

6. *A. nemorosa* L., Sp. pl. (1753) 541; Ldb., Fl. Ross. I, 15; Boiss., Fl. Or. I, 13. — *A. alba* Gilib., Fl. lith II (1782) 275. — *A. nemorosa*



PLATE XV. 1 - *Anemone ranunculoides* L., a) habit, b) stamen, c) fruitlet; 2 - *A. nemorosa* L., a) cauline leaf, b) flower; 3 - *A. altaica* Fisch., a) cauline leaf, b) flower; 4 - *A. raddeana* Rgl., upper part of stem; 5 - *A. udensis* Trautv., a) cauline leaf, b) flower; 6 - *A. reflexa* Steph., a) flower, b) stamen; 7 - *A. caucasica* Willd., habit; 8 - *A. baicalensis* Turcz., radical leaf; 9 - *A. glabrata* (Maxim.) Juz., habit.

subsp. *typica* Korsh., Fl. Vost. Evr. Ross. I (1892) 59. — Ic.: Rchb., Ic. Fl. Germ. IV, tab. 47; Garden XXXII (1887) 344; Hegi, III, Fl. Mitt.-Eur. III, tab. 116. — Exs.: HFR No. 459; Pl. Finl. exs. No. 654.

Perennial, 6–20(–30) cm high; rootstock horizontal, cylindric, smooth, yellowish or brown; radical leaves usually solitary, long-petioled, trisected into short-petioluled segments, the lateral segments bipartite, the trifid middle one with entire cuneate base and incised-serrate lobes and lobules; stems erect, glabrous or remotely pilose; involucre leaves 3, their slender 1–2 cm petioles half as long as the blade, the blade trisected into sessile segments resembling the radical leaves in their division and type of dentation; peduncles usually solitary, long, appressed-pilose; flowers 4–4.5 cm in diameter; tepals 6–8, oblong-ovate, white or on the outside reddish violet, occasionally reddish violet throughout, glabrous on both surfaces, many times as long as the stamens; anthers yellow; fruitlets 4–4.5 mm long, oblong, short-pilose, with a short curved beak. April–May. (Plate XV, Figure 2, a–b).

Damp forests, forest margins, groves, scrub, parks, and grass plots. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama (W.), U. Dnp., M. Dnp. **Gen. distr.:** Centr. Eur., Scand., Atl. Eur., Med. Described from W. Europe. Type in London.

Economic importance. The pungent taste is due to "anemonol"; when decomposed it yields the cardiac poison amemonin and pulsatilla camphor. Ornamental, especially the double-flowering forms.

7. *A. amurensis* (Korsh.) Kom., Fl. Mansh. II (1904) 262. — *A. nemorosa* subsp. *amurensis* Korsh. in A. H. P. XII (1892) 293; Korzhinskii, Fl. Vost. Evr. Ross. I (1892) 61; Hultén, Fl. Kamtch. II, 114. — *A. nemorosa* var. *kamtschatica* Kom., Fl. penins. Kamtsch. II (1929) 129. — *A. altaica* Ldb., Fl. Ross. I, 16 pro parte (quoad pl. Kamtsch.), non Fisch. — Ic.: Kom., Fl. pen. Kamtsch. II, tab. 13; Miyabe et Miyake, Fl. Saghalin (1915) tab. 2. — Exs.: HFR No. 1901.

248 Perennial, (7–)12–28 cm high; rootstock long-cylindric, smooth; radical leaves trisected into long-petioluled segments, these 3-parted to base into sessile or short-petioluled lobes; stems rather weak; involucre leaves often little developed by time of flowering, with rather broad somewhat winged, petioles with rather densely spreading hairs one-fourth to one-third as long as the segments, segments narrow-ovate, pinnatifid, their lobules and teeth subobtusate or distally rounded or short-acuminate; peduncles covered with dense erect-spreading or contiguous hairs; flowers 2.5–3 cm in diameter; tepals 5–8 (usually 6 or 7), relatively narrow, oblong, white; stamens twice as long as tepals; fruitlets few, densely pilose. In other characters the plant resembles *A. nemorosa* L. End of April to first half of June.

Broadleaf and coniferous forests, shrub thickets, and more rarely open slopes. — Far East: Uss., Kamch. **Gen. distr.:** Jap.-Ch. (Manchuria, N. Korea). Described from broadleaf forests along the lower course of the Ussuri River (Kazakevicheva station). Type in Leningrad.

8. *A. altaica* Fisch. ex C. A. M. in Ldb., Fl. Alt. II (1830) 362; Ldb., Fl. Ross. I, 16; Kryl., Fl. Zap. Sib. V, 1159. — *A. nemorosa* subsp.

altaica Korsh., Fl. Vost. Evr. Ross. I (1892) 62.— Ic.: Ldb., Ic. pl. Fl. Ross. IV (1833) tab. 388; Miyoshi et Makino., Pock.-Atl. Alp. Pl. Jap. II, tab. 47, fig. 272.— Exs.: HFR No. 251.

Perennial, 8–20 cm high; rootstock cylindric, thickened in places, yellowish grayish brown; stem glabrous; cauline leaves with scarcely pilose petioles 5–18 mm long, one-fourth to one-third the length of the blade, the latter trisected into oblong-ovate acuminate segments, the lateral sessile or subsessile, sometimes bilobate, oblique, the middle segment short-petioluled, sometimes trilobate, all segments entire only at base, otherwise subulate-dentate with dorsally convex teeth; peduncles solitary, covered with appressed or erect-spreading hairs; flowers rather large, 2–4 cm in diameter; tepals 8–12 (usually 9), oblong, obtuse, white, sometimes violet beneath, glabrous on both surfaces; fruitlets covered with short rigidulous erect-spreading or distant hairs, with a short recurved beak. April–May. (Plate XV, Figure 3, a–b).

Coniferous and mixed forests, forest margins, grass plots, and more rarely meadows.— Arctic: Arc. Eur.; European part: Dv.-Pech., V.-Kama, Transv., V.-Don (Penza); W. Siberia: Ob, Irt., Alt.; E. Siberia: Yenisei, Ang.-Say. **Gen. distr.:** Reported also for Japan. Described from Altai. Type in Leningrad.

9. *A. umbrosa* C. A. M. in Ldb., Fl. Alt. II (1830) 361; Ldb., Fl. Ross. I, 15; Kryl., Fl. Zap. Sib. V, 1158.— Ic.: Ldb., Ic. pl. Fl. Ross. II (1830) tab. 118.

Perennial, 10–25 cm high; radical leaves usually 1 or none, long-petioled, 5-sect, with broad rhombic or ovate slightly acuminate segments with short petiolules; stems slender, somewhat flexuous, glabrous; petioles of involucral leaves 1–3.5 cm, two-fifths to half the length of the blade, blade trisected to base into elongate-rhombic cuneate segments, segments entire, acute, shallowly trifid (the lateral mostly bifid), coarsely incised-dentate; leaf blade remotely appressed-pilose above, more densely so beneath; peduncles solitary, rarely 2, covered with accumbent hairs; flowers 2–2.5 cm in diameter; tepals 5, elliptic, white, appressed-pilose beneath (sometimes only along a median line); ovary silky-pubescent; style short, thickish, smooth.

Shaded stony places, forest margins, and scrub.— W. Siberia: Alt.; Far East: Uss. **Gen. distr.:** Jap.-Ch. (Manchuria, N. Korea). Described from the vicinity of Riddersk [Leninogorsk] (Grammatukha River). Type in Leningrad.

10. *A. raddeana* Rgl. in Bull. Soc. Nat. Mosc. XXXIV (1861) 16; Kom., Fl. Mansh. II, 266.— *A. raddeana* subsp. *villosa* Ulbr. in Engl. Bot. Jahrb. XXXVII (1906) 221.— Ic.: Rgl., l. c., tab. 1, fig. 2.

Perennial, 6–28 cm high; rootstock horizontal, rather short, fusiformly thickened with large pellucid-scarious scales at tip and on base of stem; radical leaf usually 1, long-petioled, covered with rather sparse longish horizontally spreading hairs, trisected into broad-ovate, occasionally sub-orbicular segments with longish petiolules, petioles and petiolules pubescent; base of segments often somewhat cordate, segments tripartite, the lobes narrow-ovate, shallowly 2–3-fid, with entire or 2–3-toothed subobtusely lobules; leaf segments narrow, glabrous or with isolated long

spreading hairs; stems with rather sparse or isolated long horizontally spreading hairs, frequently glabrous in lower half, occasionally entirely glabrous; involucreal leaves in upper half of plant [sic], pubescence of their petioles like that of stem, the blade trisected into linear or oblong or obovate segments, distally shallowly 2-3-fid or dentate, proximally margin usually with long spreading hairs; peduncles solitary, short, glabrous or covered with horizontally spreading hairs; tepals 10-15, either narrow and almost linear-lanceolate or broader and oblong-ovate, glabrous on both surfaces; stamens one-third to half as long as tepals; ovary pilose. March-April. (Plate XV, Figure 4).

Dense shady forests and damp mountain valleys. — Far East: Ze.-Bu., Uss., Sakh. **Gen. distr.:** Manchuria. Described from the Amur River. Type in Leningrad.

Note. Replaced in Japan by a related race which is distinguished, among other things, by the complete lack of pubescence on the stem and on other parts of the plant (*A. raddeana* subsp. *glabra* Ulbr., l.c. = *A. maximowiczii* Juz. in sched.).

- 250 11. *A. udensis* Trautv. et Mey. in Middend. Reise, Fl. Ochot. II (1847) No. 7. — Ic.: Trautv. et Mey., l.c., tab. 26; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, No. 3 (1861) tab. 1, fig. 3.

Perennial, 12-25 cm high; rootstock long-creeping, slender, with elongated internodes, sometimes with long slender creeping shoots; radical leaves usually lacking; stems covered with rather dense horizontally spreading hairs; involucreal leaves 3, large, with long petioles as long or half as long as the blade, pubescence as on stem; leaf blade trisected, the segments short-petioluled, broad-obovate, base obtuse or short-acuminate, distally entire, sometimes very shallowly trifid, distal half rather coarsely dentate, with broad abruptly subacuminate teeth; leaf blade rather thin, glabrous above, remotely or rather densely spreading-pilose beneath; peduncles solitary, rather slender, flexuous, with predominantly rather short erect-spreading hairs; flowers 2-3.5 cm in diameter; tepals ovate or broad-ovate, subobtusely or obtuse, pure white, apically appressed-pilose beneath; stamens one third length of the tepals; ovary covered with dense silvery white hairs. May to mid-June. (Plate XV, Figure 5, a-b).

Broadleaf forests, forest margins, shrub thickets, and shaded dryish stony slopes. — Far East: Ze.-Bu., Uss., Uda. **Gen. distr.:** Jap.-Ch. (Manchuria). Described from Udkii Ostrog. Type in Leningrad.

Subsection 2. REFLEXA Ulbr. in Engl. Bot. Jahrb. Bd. XXXVII (1906) 194. — Tepals narrow, recurved. Filaments irregularly broadened, connectives broad.

12. *A. reflexa* Steph. in Willd., Spec. pl. II (1797) 1281; Ldb., Fl. Ross. I, 14; Kryl., Fl. Zap. Sib. V, 1155. — Ic.: Deless., Ic. Sel. I (1820) tab. 15.

Perennial, 12-25 cm high; rootstock creeping, cylindric, yellowish grayish brown; radical leaves long-petioled, glabrous like the stem, their segments short-petioluled, rhombic or ovate; involucreal leaves 3, petioles 1-1.5 cm, covered with sparse spreading hairs, blade trisected, segments

sessile, elongate-rhombic or lanceolate, long-acuminate, the lateral segments often bifid, the outer lobule entire proximally, the middle segment with entire base, otherwise the segments coarsely subulate-dentate or incised-dentate, with acute or subobtusate teeth, margin more or less ciliate otherwise glabrous or remotely pilose; peduncles solitary, rarely 2, pubescent, 1.5–3 cm; flowers ca. 1 cm in diameter; tepals 5, rarely 6, 6–7 cm long, 1–1.5 mm broad, linear-oblong, tapering to base, white, pubescent on the outside; fruitlets oblong-ovate, covered with dense erect-spreading hairs, with a recurved beak. May to beginning of June. (Plate XV, Figure 6, a–b).

Coniferous, mixed, sometimes broadleaf (birch), but mostly rather sparse forests. — European part: V.-Kama (Perm); W. Siberia: Ob, Alt.; E. Siberia: Yenisei, Ang.-Say., Daur.; Far East: Uss. Gen. distr.: Mong. (N.), Jap.-Ch. (N. Korea). Described from Siberia. Type in Berlin.

Section 2. **TUBEROSA** Ulbr. in Engl. Bot. Jahrb. XXXVII (1905) 194. — Rootstock tuberous, rounded or somewhat elongated; tepals narrow-lanceolate, numerous; receptacle rather strongly convex.

13. *A. caucasica* Willd., herb. ex Rupr., Fl. Cauc. (1869) 14, 286; Boiss., Fl. Or. Suppl., 3; N. Busch in Fl. cauc. crit. III, 3, 90. — *A. appenina* M. B., Fl. taur.-cauc. II, 19 p.p., non L. — *A. appenina* β *parvula* DC., Prodr. I (1824) 19 p.p.; Ldb., Fl. Ross. I, 14. — Exs.: Herb. Fl. Cauc. No. 353; Pl. or exs. No. 110.

Perennial; stem 5–20 cm high; rootstock smallish, 5–13 mm in diameter, ovate or almost circular in cross section; radical leaves with long petioles, these glabrous or remotely pilose like the stem, blade ternately dissected into sessile or subsessile segments, the lateral bipartite to base, both the inner lobes and the middle segment trifid with rather short shallowly serrate-dentate lobules and few subobtusate teeth, the leaf blade glabrous or with isolated hairs above; involucral leaves with rather short petioles, similar to radical leaves but with entire lobules or with only isolated teeth; peduncles pilose; tepals 8–10, smallish, 7–15 mm long, linear-oblong, blue, glabrous on the outside; fruitlets pilose with a conspicuous but short curved style. April–May. (Plate XV, Figure 7).

Meadow and scrub in the forest and alpine zones. Caucasus: Ciscauc., W. Transc. (Abkhazia), E. and S. Transc., Tal. Gen. distr.: N. Iran. Described from Georgia. Type in Berlin.

Note. This species is the USSR variant of the West European *A. appenina* L.

14. *A. blanda* Schott et Kotschy in Oesterr. Wochenbl. (1854) 139. — *A. appenina* Ldb., Fl. Ross. I, 14, non L. — Ic.: Garden LXXI (1907) 178; LXXV (1911) 152 (phot.). Exs.: Fl. Cauc. exs. No. 157.

Perennial; stem 12–25 cm high; rootstock oblong, short-cylindric, thick; radical leaves with long petioles that, like the stem, are remotely pilose or glabrous, the leaf blade trisected, the segments short-petioluled or subsessile, trifid to the middle with shallowly incised-dentate lobules and with few subobtusate or obtuse, sometimes almost rounded teeth, the leaf blade appressed-pilose above, glabrous beneath; involucral leaves long-petiolled, trisected to base, the segments sessile, trifid to the middle,

with coarsely 2-3-toothed lobules and subobtusate teeth; peduncles covered with accumbent hairs; flowers 2-3.8 cm in diameter; tepals 9-18, 10-22 mm long, linear-oblong, blue, glabrous on the outside; fruitlets short-pilose, with a displaced black verrucose or almost obsolete style. April-May.

Dry hills, scrub, forests (oak), forest margins, and lower part of the forest zone. — Caucasus: Cisc. (Stavropol, Kuban River area), W. Transc. (Novorossiisk, Adzharia?), E. Transc. (Abastuman?). **Gen. distr.:** Bal.-As. Min. Described from the Taurus Mountains.

Note. The Ciscaucasian plant must be thoroughly compared with the authentic *A. blanda*, as its area of distribution is disjunct from the main range of *A. blanda*.

Section 3. **STOLONIFERA** Ulbr. in Engl. Bot. Jahrb. XXXVII (1905) 195. — Rootstock sometimes (in *A. flaccida*) cylindric with short internodes, in most species with elongated internodes, 10-15 mm long, covered with squamiform leaves from axils of upper squamiform or radical leaves; there are produced short (in USSR species) or very long stolons. In other characters this section resembles section *Sylvia*, from which it is distinguished by the often conspicuous reduction of the third leaf of the involucre and by the smaller flowers, as a rule, with a definite number of tepals.

Series 1. **Flaccidae** Juz. — Rootstock rather thick and short; cauline leaves very short petioled, differing little from radical leaves in size and in type of segmentation, with deeply incised-dentate lobes and mostly obtuse teeth.

15. *A. flaccida* F. Schmidt in Mém. Ac. Sc. Pétersb. VII sér., No. 2 (1868) 103. — Ic.: Somoku Dzusetsu, ed. 2, X (1874) tab. 32; ed. Makino (Iconogr. Pl. Nipp.) X (1910) tab. 32.

Perennial, 9-30 cm high; rootstock creeping, thickish, cylindric, black, with small transverse scars without remnants of previous year's leaves; stem erect, weak, succulent, when dry taeniate-applanate; stem (especially above) and petioles of radical leaves glabrous or remotely pilose; radical leaves long-petioled, trisected, the lateral segments 2-3-parted considerably below the middle into bifid lobes, the middle segment trifid to the middle, with incised-dentate lobules and with divaricate obtuse or slightly sub-acuminate teeth, the leaf blade glabrous on both surfaces or remotely pilose above; involucral leaves 3, resembling the radical leaves, subsessile with narrow base; one of the involucral leaves simple, rhombic-obovate cuneate, the remainder larger, tripartite, the lobes narrowed proximally, entire, apically incised-dentate, with 9-11 divaricate teeth; peduncles 1-2, occasionally 3, long, covered with soft spreading and in upper part accumbent hairs; flowers 1.5-3 cm in diameter; tepals 5-7, twice as long as stamens, narrow-oblong, tapering to base, white, greenish on the outside, glabrous on both surfaces or with scattered hairs toward base on the outside, long-persistent and deciduous together with mature fruits; pistils appressed-pilose; fruitlets somewhat inflated, appressed-pilose, at maturity frequently glabrate, with an oblique thickened sessile stigma. May-June.

Silty soil on the banks of rivulets. — Far East: Sakh. Gen. distr.: Jap.-Ch.? Described from Due and the village of Mgachi in Sakhalin. Type in Leningrad.

Note. Plants from Japan and China referred to this species may be different.

Series 2. **Baicalenses** Juz. — Rootstock very slender, greatly elongated; involucreal leaves considerably smaller than the radical, sessile, with lobes and teeth considerably more acute than in radical leaves.

16. **A. baicalensis** Turcz. in Bull. Soc. Nat. Mosc. XV (1842) 42; Ldb., Fl. Ross. I, 17.

Perennial, 18–35 cm high; rootstock slender, elongated, developing slender shoots and rooting profusely; stem, as also petioles of radical leaves, covered with more or less dense spreading or somewhat reclinate soft hairs; radical leaves with very long petioles, reniform or broadly cordate or suborbicular, trisected to base, the segments sessile or with scarcely discernible petiolules, ovate-rhombic, narrowed at base, the lateral segments bipartite to the middle, their lobes, as also the middle segment, trifid (outer lobe usually bifid), with incised-dentate lobules and with rather small subacuminate teeth (15–38 in the middle segment); leaf blade remotely or rather densely pilose on both surfaces, with accumbent hairs above and spreading hairs beneath; involucreal leaves much smaller than the radical, sessile, 3-parted to three-fourths their length into incised lobes, dentate lobules, with few shallowly incised acute teeth; peduncles 1 or 2, elongated, with rather sparse spreading or in upper part erect-spreading hairs; flowers rather large, ca. 2–2.5 cm in diameter; tepals 5(–7), oblong-ovate, often somewhat dissimilar, white, with accumbent hairs on the outside or with few hairs only near base; ovaries densely appressed-pilose; fruitlets 4–6, broad-elliptic, flattened, covered with short rigidulous accumbent or erect hairs, with an apical sessile turban-shaped stigma. July. (Plate XV, Figure 8).

Shaded herb-covered sites and forests. — E. Siberia: Ang.-Say., Dau. Endemic? Described from the southern shore of Lake Baikal near the mouths of the Khara-Murin and Vydrinka rivulets. Type in Leningrad.

17. **A. glabrata** (Maxim.) Juz., comb. nova. — *A. baicalensis* var. *glabrata* Maxim., Prim. fl. Amur. (1859) 18. — *A. baicalensis* Kom., Fl. Mansh. II, 1 (1903) 265, non Turcz. — Ic.: Komarov and Klob.-Alisova, Key for pl. far-east. reg. USSR 1 (1931) tab. 164.

Perennial, 6–35 cm high; rootstock slender, with elongated internodes, producing shoots and abundant rootlets; stem, as also petioles of radical leaves, usually glabrous, rarely with isolated or few hairs, twice as long as or one-third longer than petioles of radical leaves, the latter frequently reniform, rarely suborbicular, trisected to base, the segments sessile or subsessile, the segments broad-rhombic with a broad obtuse-angled or right-angled base, usually contiguous-margined, more rarely divergent; lateral segments bipartite to three-fourths or to the middle, with shallowly bifid lobes, the middle lobe shallowly trifid, with entire or 2–3-fid lobules, the latter also very coarsely and irregularly crenate-dentate, with mostly

obtuse rounded or rarely subacuminate teeth (13–24 in middle segment); leaf segments remotely pilose or glabrate above, glabrous or with few scattered hairs mainly along the veins beneath, margin appressed-ciliate; involucre leaves 2 or 3, elliptic, narrowed at both ends, 2 of them 2–3-fid, their lobes entire or usually with 1–2 subacuminate or acute large teeth on each side, the third involucre leaf if present usually entire; peduncles 1 or 2, rather short, sometimes glabrate, usually covered with scattered or (especially above) rather dense erect-spreading or accumbent hairs; flowers 1.5–2.7 cm in diameter; tepals 5, obovate or sometimes sub-orbicular, white, glabrous on the outside; stamens about half as long as tepals; pistils and fruitlets quite glabrous; achenes ovoid-ellipsoid, somewhat obliquely narrowed above, with sessile displaced stigmas. May to beginning of June. (Plate XV, Figure 9).

Forest margins, scrub, river valleys, more rarely meadow slopes, and moist soil. — Far East: Ze.-Bu., Uss., Uda. **Gen. distr.:** Jap.-Ch. (Manchuria). Described from near the village of Daiso on the Amur River. Type in Leningrad.

18. *A. litoralis* (Litw.) Juz., comb. nova. — *A. baicalensis* var. *litoralis* Litw. in Sched. ad Herb. Fl. Ross. VI (1908) 117. — Exs.: HFR No. 1902.

255 Perennial; stem 5–12(–25) cm; stem, as also petioles of radical leaves, glabrous or (above or very rarely throughout) remotely pilose; radical leaves trisected, the segments usually with a narrower base than in *A. glabrata* but otherwise similar to the latter species, the leaf teeth fewer and larger than in *A. baicalensis*, often subobtuse; leaf blade entirely pilose or only along the veins above, usually glabrous, sometimes entirely sparsely pilose beneath but only rarely so along the veins proximally, margin appressed-ciliate; involucre leaves deeply incised-dentate, with few elongated acuminate teeth; peduncles rather short, with scattered or sparse loosely accumbent hairs; ovaries and fruitlets appressed-pilose (sometimes only proximally). In other characters this plant is similar to *A. baicalensis* and even more similar to *A. glabrata*, from which it is distinguished only by its somewhat smaller size, and in particular by the pilose pistils and fruitlets. May to beginning of June.

Forests and scrub. — Far East: Uss. (shore zone). **Gen. distr.:** Jap.-Ch., Manchuria? Described from the vicinity of Vladivostok. Type in Leningrad.

Note. A minor geographic variety, replacing the more widely distributed *A. glabrata*; also, it should be compared with the Manchurian-Korean *A. rossii* S. Moore, of which we have not seen specimens.

Subgenus 2. **RIVULARIDIUM** Jancz. in Revue gener. de Bot. IV (1892) 251. — Achenes thick, firm, glabrous or slightly and remotely pilose, with a rather large lignified hamately curved beak; rootstock of varying shape; inflorescence profusely branched, rarely unbranched and then 1-flowered; involucre 3-leaved; radical leaves usually much reduced, entire. Only one section in the USSR.

Section 1. **RICHARDSONIA** Ulbr. in Engl. Bot. Jahrb. XXXVII (1905) 199. — Smallish monanthous plants with a slender filiform rootstock slightly rooting at the nodes; radical leaves persistent at flowering; involucre leaves strongly developed, similar to the radical. Filaments filiform. Fruitlets with a short curved beak. Only one species.

19. *A. richardsonii* Hook. in Frankl. 1 Journ. ed. II, app. p. 21; Fl. Bor.-Amer. I (1830) 6; Ldb., Fl. Ross. I, 16; Kom., Fl. penins. Kamtsch. II, 128. — *A. vahlii* Hornem., Ok. dän. Fl. vol. II, 198 suppl. (a. 1835). — *A. arctica* Fisch. in sched. — *A. trifida* C.A.M. in sched. — Ic.: Hook., Fl. Bor.-Amer. 1 (1830) tab. IV, f. A.; Fl. Dan. fasc. 37 (1836) tab. 217b. (*A. vahlii*).

Perennial, 8–25 cm high; rootstock very slender, creeping, radical leaf solitary, its long petiole covered like lower part of stem with horizontally spreading hairs, the leaf blade reniform or rounded-reniform, shallowly 3–5-lobed, with shallow large teeth; cauline leaves 3–10 cm above ground, sessile, flabellately trilobate, the lobes broad-obovate, shallowly 2–3-fid, with few largish rather acute teeth in distal part; one of these (the third) usually rudimentary; peduncles 4–8 cm, covered with somewhat accumbent hairs; flowers solitary, 1.5–3 cm in diameter; tepals 6, yellowish white or sulfur yellow, ovate or rather narrowly ovate; ovaries glabrous; styles long, filiform; fruitlet oblong-ovate, with very long yellowish curved beak with hamate tip (Plate XVI, Figure 1, a–b).

Mountain tundras. — Arctic: Arc. Sib. (E. of the Lena River mouth); An. (Gizhiginsk); Far East: Kamch. (N.; Komandorskie Islands), Okh. (S. as far as Ayan). **Gen. distr.:** N. Am. (in Greenland — *A. vahlii* Hornem.). Described from Hudson Bay. Type unknown.

Subgenus 3. **PULSATILLOIDES** DC. Syst. I (1818) 196, emend. — Fruitlets covered with obliquely spreading straight rigidulous hairs or glabrous, gradually, rarely abruptly tapering to a straight beak; involucre 2 or 3-leaved, usually strongly reduced.

Only one section in the USSR.

Section 1. **HIMALAYICAE** Ulbr. in Engl. Bot. Jahrb. XXXVII (1906) 201. — Rather low plants with a rosette of radical leaves; filaments ribbon-like, dilated; fruitlets usually covered with dense straight rigidulous hairs.

20. *A. obtusiloba* Don, Prodr. fl. Nep. (1825) 194. — *A. micrantha* Klotzsch in Kl. et Garcke, Botan. Ergebn. Reise Pr. Waldem. v. Preuss. (1862) 133. — Ic.: Royle, Illustr. Him. I, II (1834) 52; Bot. Reg. XXX (1844) tab. 65; Klotzsch u. Garcke, l. c. (1862) tab. 38.

Perennial, 4–15 cm high; rootstock short, vertical, producing abundant fibrillose rootlets, distally enveloped by fibrous remnants of petioles; radical leaves with rather long petioles, covered with dense shortish spreading hairs, the leaf blade small, cordate, firm, slightly coriaceous, at first densely pilose, subsequently glabrate above, trisected to base, the segments sessile, very broadly obovate, cuneate, obtuse at top, shallowly

257 trifid, the lobules overlapping at the margins, entire or the middle lobule usually with 3 large crenate teeth; stem mostly arcuately ascending proximally, its pubescence identical with that of the petioles; involucre leaves 3, cuneate, apically trifid with narrow oblong subobtusate or obtuse lobes, appressed-pilose; peduncles 1 or 2, somewhat longer or considerably longer than the involucre, appressed-pilose; flowers small, 0.8–1.5 cm in diameter; tepals obovate, whitish on the inside, on the outside with numerous dark-colored veins or dingy violet-blue throughout, appressed-pilose; fruitlets small, ovate, pilose, with a glabrous beak. July. (Plate XVI, Figure 2, a–c).

Alpine tundras, rocks, and stony slopes. — Centr. Asia: T. Sh. Gen. distr.: Middle Asia, Jap.-Ch. Described from the Himalayas.

Note. Forms of this presumably collective species require critical study. For the present it should be noted that the USSR plant is closer to the description and illustration of *A. micrantha* Klotzsch (accepted as a synonym of *A. obtusiloba* Don) than to the authentic *A. obtusiloba*.

Subgenus 4. **ERIOCEPHALUS** Hook. f. et Thoms. in Fl. Indica I (1856) 20. — Involucre leaves usually more or less reduced, sometimes well developed, resembling the radical leaves; inflorescence simple, 1-flowered or branched and then the lateral flowers with an involucre of bracts close to flower; receptacle much elongated, often very long, cylindric, more or less white-tomentose; fruitlets densely enveloped with very long soft crisp white unicellular hairs.

Section 1. **ORIBA** Adans. Fam. II (1763) 459. — Rootstock tuberous, bearing short fleshy shoots. Flowers solitary or 2 or 3.

Subsection 1. **CORONARIOIDES** P. Popow in Tr. Tifl. Bot. Sada XII, 2 (1913) 173. — Leaf teeth acute; involucre leaves sessile, gradually tapering to base; flowers solitary, frequently rather large. One representative in the USSR.

21. *A. kuznetzowii* Woron., ex Grossh., Fl. Cauc. II (1930) 105. — *A. coronaria* P. Popow in Tr. Tifl. Bot. Sada XII, 2 (1913) 170, non L.

258 Perennial; stem 10–20(–40) cm, slightly longer than radical leaves at flowering and later twice as long; radical leaves with long flexuous remotely pilose petioles, bipinnatisect, with 2 pairs of lateral segments, the lower long-petioluled, the upper with shortish petiolules, their subdivisions with short petiolules or sessile, deeply pinnatifid or pinnatifid, their lobes or lobules entire or usually with few acute teeth, ciliate-margined; stems covered with rather sparse erect-spreading hairs; involucre leaves sessile, only slightly resembling the radical leaves, broad-rhombic, 3-parted to the middle into 2–3-lobulate lobes, the lobules narrow, elongated, acute, entire or with 2–3 elongated apical teeth, margins long-ciliate, peduncle densely covered with sericeous hairs; flowers 3.5–4.5 cm in diameter; tepals 2–2.5 cm long, broad-obovate, red, proximally with a circular patch of dark spots on the inside (Grossheim, l. c.), appressed-pilose on the

outside; filaments purple; anthers and styles blackish violet; fruits unknown. April.

Scrub. — Caucasus: S. Transc. (S. Karabakh). Endemic. Described from the former Karyagino County, between the village of Dashkesan and Tyuzlyakhskaya station. Type in Leningrad.

Note. Though we have reserved for the Karabakh plant the name proposed by Yu. N. Voronov, we consider it as a strictly provisional designation for one of the numerous forms of the composite Mediterranean group *A. coronaria* s.l., which urgently requires monographic treatment.

Subsection 2. BIFLORA P. Popov in Tr. Tifl. Bot. Sada XII, 2 (1913) 173. — Leaf teeth subobtuse or obtuse. Flowers frequently 2 or 3, usually smaller than in subsection Coronarioides.

Cycle 1. EU-BIFLORA Juz. — Involucral leaves abruptly tapering proximally into a narrow cuneate base, frequently in the shape of a broad winged sometimes sheathlike petiole [sic].

22. *A. bucharica* Rgl., ex Finet et Gagnep. in Bull. de la Soc. Bot. de France 51 (1904) 75 (nomen). — *A. coronaria* δ *bucharica* Rgl. in A.H.P. VIII (1884) 689.

Perennial; stem 6–30 cm high, slightly longer than or twice as long as petioles of radical leaves at beginning of flowering, in fruit frequently many times as long; radical leaves with more or less long glabrous petioles, trisected, the lateral segments subsessile or with very short petiolules, the middle segment on a more or less long (4–15 mm) petiolule, the segments bipartite almost to base (the lateral) or trisected to base (the middle segment), the middle subdivision of the middle segment usually with a conspicuous petiolule, thus the entire leaf appearing almost pinnatisect; subdivisions and lobes 2–4-fid, their incised-dentate lobules with 2–6 elongated, obtuse or mostly somewhat subacuminate teeth; stem glabrous in its lower half or with isolated appressed hairs, its upper part (below involucre) appressed-pilose; involucral leaves 3, sometimes 2, lower half narrowly or rather broadly cuneate resembling a broad-winged petiole, ciliate-margined, distally trisected to base, the segments 2–3-partite and 2–3-fid, with entire or 2–3-toothed lobules; peduncles 1 or 2, the lateral with a small involucre in its middle part, the involucral leaves resembling those of the main involucre but somewhat reduced, appressed-pilose throughout (more densely above); flowers erect, frequently very large, 3–4 cm in diameter; tepals 5, obovate to suborbicular, mostly apically rounded, purple with a blackish, rarely yellow beak (see note), densely appressed-pilose on the outside; filaments violet; anthers purple; style blackish, shorter than the 4-mm-long ovary of the ripe fruitlet. April to mid-May. (Plate XVI, Figure 5a, b).

Slopes. — Centr. Asia: Pam.-Al. (Tadzhikistan: Bal'dzhuan, Gissar, Kulyab). Endemic. Described from the Panj River and from Kulyab. Type and paratype in Leningrad.

Note. A yellow-flowered variety of this species (*A. baissunensis* Juz. ined. — *A. coronaria intermedia* Rgl. in A.H.P. VIII (1884)

689. — *A. biflora* auct. fl. As. Med. p.p., non DC. — Ic.: Rgl., l.c., tab.XV, a. — Exs.: H.F.A.M. No.133 (sub nom. *A. biflora* DC.). appears to deserve specific status; it is characterized by its somewhat more westerly distribution area and, according to an oral report by A.I. Vvedenskii, it does not occur together with the typical form.

23. *A. petiolulosa* Juz. spec. nova in Addenda VI, p.565. — *A. coronaria* β pluriflora Rgl. in A.H.P. VIII (1884) 689. — *A. biflora* auct. fl. As. Med. p.p., non DC. — Ic.: Rgl., l.c., tab.XV, a. — Exs.: H.F.A.M. No.133 (sub nom. *A. biflora* DC.).

Perennial; stem 2–18 cm high, 2–3 times as long as petioles of radical leaves; radical leaves with glabrous petioles, trisected, the segments with more or less long petiolules (2–15 mm) frequently longer than the segment; segments 2–3-sect to base or 2–3-partite almost to base, in the former case the subdivisions sessile or the middle subdivision short-petioluled, 2–3-fid to about the middle, the lobules entire or with 2–3 obtuse or short-acuminate teeth; blade glabrous; stem glabrous or with isolated appressed hairs in its upper part; involucre leaves 2–3, with a cuneate or broad linear petiolate base, 3-fid, their lobes also 3-fid and with 2–3-toothed lobules; peduncles 1–3, appressed-pilose, very densely pubescent above, the lateral peduncles with a 2-leaved involucre in their lower part; flowers usually somewhat declinate, subsequently nutant, 1–3(–4) cm in diameter; tepals 5, ovate or elliptic or elongate-elliptic, rounded or slightly narrowed at apex, light yellow, on the outside more or less reddish and densely appressed-pilose; stamens with linear-oblong anthers and with filaments dilated toward base; styles yellowish; fruitlets ca. 4 mm long. End of March through April. (Plate VI, Figure 4).

Clayey, rarely stony steppes and mountain slopes in the foothill and juniper zones. — Centr. Asia: T. Sh. (W.), Pam.-Al. (Turkestan Range, Zeravshan and Kugitang ranges), Mtn. Turkm. Endemic. Described from W. Tien Shan, from the Karshan-tau Mountains. Type in Leningrad.

260 Note. The semidesert and steppe forms from western Tien Shan are not fully identified with the forms found at higher localities (juniper zone), especially in the Turkestan Range and Zeravshan; characterized by the larger dimensions of the entire plant, the often shorter petiolules of the leaf segments, the thinner yellowish green leaves with more subacuminate teeth, and, on the average, larger flowers. It is therefore as yet difficult to decide whether we are dealing with a separate variety or merely a separate form. Plants from mountainous Turkmenistan are also distinguished by large flowers, which may have blackish styles, unlike the Tien Shan and Pamir-Alai forms. It is possible that the Turkmenian plants will eventually be distinguished as separate taxon. Finally, in the Baisum area, there is a form which differs from the typical *A. petiolulosa* by extremely short petiolules of the lateral segments of the radical leaves (sometimes the segments are subsessile). This indicates that it may be intermediate between *A. petiolulosa* and *A. baissunensis* Juz.; it is possible to treat it as a separate narrow-ranged variety of *A. kronenburgii* Juz., with a narrow geographical range.

24. *A. gortschakowii* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 131. — *A. biflora* auct. fl. Turkest. p.p., non DC.

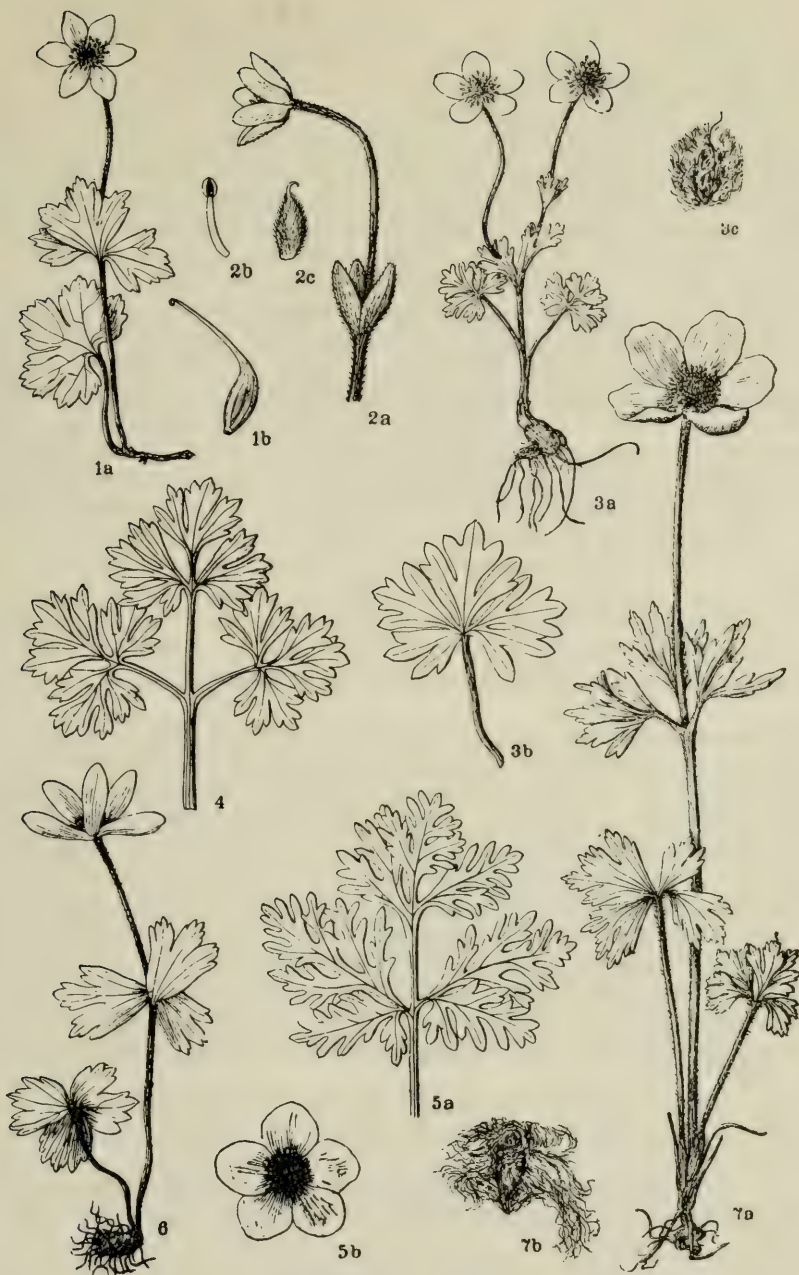


PLATE XVI. 1 - *Anemone richardsonii* Hook., a) habit, b) achene; 2 - *A. obtusiloba* Don., a) upper part of stem, b) stamen, c) achene; 3 - *A. gortschakowii* Kar. et Kir., a) habit, b) radical leaf, c) achene; 4 - *A. petiolulosa* Juz., radical leaf; 5 - *A. bucharica* Rgl., a) radical leaf, b) flower; 6 - *A. tschernjaewii* Rgl., habit; 7 - *A. silvestris* L., a) habit, b) achene.

263 Perennial, 4–15 cm high; stem at beginning of flowering slightly longer than or twice as long as the radical leaves, subsequently three times as long; leaves glabrous, borne on glabrous petioles, palmately trisected, the segments all sessile or subsessile, more rarely the middle segment with a short petiolule; lateral segments deeply bipartite, the lobes cleft to about the middle into 2–3 cuneate lobules, these incised-crenate-dentate with 2–3 short obtuse or subacute frequently apically reflexed teeth terminating in a smallish almost verrucose point; middle segment tripartite to about the middle, its lobes similar to those of the lateral segments; total number of teeth in middle segment 9–13; involucre leaves 3, cuneate, tripartite to the middle, the lobes 2–3-fid, with 2–3-toothed or entire lobules; [involucre] leaves subtend 1 or 2 single-flowered peduncles, in the latter case the lateral peduncle bearing in lower part or in the middle 2 smallish bracts resembling the involucre leaves but smaller and reduced; stem glabrous below the involucre, peduncles appressed-pilose, greatly elongating after flowering; flowers erect or declinate, nutant after flowering; tepals 5, oblong-elliptic, obtuse, pale yellow, in fruit reddish on the outside, densely appressed-pilose; filaments dilated toward base; anthers linear-oblong or linear; styles yellowish; fruitlets 2–2.5 mm long, elliptic, densely lanate, the hairs about as long as the fruitlet; fruiting styles 0.5 as long as ripe ovary, hidden by its lanate pubescence. Fl. April–May. (Plate XVI, Figure 3, a–c).

Foothill zone on mountain-steppe slopes and scrub. — Centr. Asia: Dzu.-Tarb. (Dzungarian Ala Tau), T. Sh. (central part). Endemic? Described from the Air River in Dzungaria. Cotype in Leningrad.

25. *A. almaatensis* Juz., sp. nova in Addenda VI, p. 565.

Perennial, closely related to *A. gortschakowii*, from which it is distinguished by the following characters: whole plant weaker and more slender, the stem to 25 cm high; leaves more strongly dissected, the middle segments usually with a short but conspicuous petiolule, tripartite to below the middle or sometimes almost to base, the lobes with lobules and with teeth are also more deeply cleft, the teeth strongly elongated, somewhat fewer (total number of teeth in the middle leaf segment 12–17(–20), with a more conspicuous apical point; involucre leaves dissected similarly to the radical leaves, also distinguished by their teeth, which are more elongated and acuminate than in *A. gortschakowii*; tepals usually somewhat narrower than in *A. gortschakowii*, oblong-ovate, frequently tapering toward apex. April.

Dry mountain slopes (foothills) and clayey soils. — Centr. Asia: T. Sh. (Alma-Ata area). Described from the vicinity of Alma-Ata. Type in Leningrad.

Note. Apparently a local variety of lower taxonomic status, which requires further study and experimental verification of the constancy of its characters.

26. *A. oligotoma* Juz., sp. nova in Addenda VI, p. 566. — *A. tscher-naewi* Paulsen (saltem in sched.), non Rgl. — *A. biflora* auct. fl. Turkest. p.p.

Perennial, 6–20 cm high; radical leaves with glabrous petioles, palmately trisected into sessile or subsessile segments, the lateral parted

to below the middle or almost to base, the 2-3-toothed lobes, usually 2-3-cleft to one-third into lobules with 2 rather short crenate teeth; middle segment usually tripartite not below the middle, the lobes 2-3-toothed or 2-3-cleft into bidentate lobules (total number of teeth in middle segment (5-)7-9(-12)); involucre leaves cuneate, tripartite to the middle, with 2-3-lobed lobes, lobules entire or 2-3-toothed with obtuse or subacute teeth, the [involucre] leaves subtending 1 or 2 single-flowered peduncles, the lateral peduncle with 2 smallish bracts at about the middle; peduncles covered with rather dense appressed somewhat crispate hairs; flowers 1.5-3.5 cm in diameter; tepals narrowly oblong-ovate to broad-ovate, pale yellow, reddish and appressed-pilose on the outside; filaments yellowish, dilated toward base; anthers yellowish, linear-elliptic, ca. 1 mm long; fruitlets ca. 3 mm long, styles half this length. April to beginning of June.

Stony mountain slopes, taluses and solonchik meadows on banks of mountain streams. — Centr. Asia: Pam.-Al. (Alai Range and Alai Valley). Endemic. Described from the Isfairam River valley, below the Tengiz-bai Pass (Desyatova, No. 1068). Type in Leningrad.

Note. Very closely related to the Tien Shan *A. gortschakowii*, but differing somewhat in less strongly dissected leaves and fewer and shorter obtuse teeth.

Cycle 2. TSCHERNJAEWIANAE Juz. — Involucre leaves sessile, with broad base.

27. *A. eranthioides* Rgl. in A.H.P. VIII (1884) 691. — Ic.: Rgl., l.c., tab. XIV, fig. 2, f, g, h, i, k.

Perennial, 2-8(-12) cm high; rootstock tuberous, the 1 or 2 radical leaves 3- or almost 5-sect, the segments short-petioluled or sessile, shallowly trifid at the apex, the lobules mostly with 2-3 crenate teeth; involucre leaves 3, sessile, cuneate-obovate, rather deeply (sometimes almost to the middle) trifid, with 2-3-toothed lobes and obtuse teeth; leaf blade glabrous or with scattered short appressed hairs above; peduncles solitary, occasionally 2 or 3, often shorter than or subequal to, rarely slightly longer than the involucre, appressed-pilose; flowers 1-2.5 cm in diameter; tepals 5(-8), ovate-oblong, mostly obtuse, on the inside golden-yellow, on the outside greenish or (especially distally) reddish, more or less pilose, sometimes glabrate; anthers elliptic or oblong, yellow; ovaries and styles glabrous; fruitlets with long woolly hairs, styles half this length. April.

Beside mountain streams at 1,500-1,800 m. — Centr. Asia: Pam.-Al. (Tadzhikistan). Endemic. Described from Bukhara, from the former khanate of Bal'dzhuan (Ak-su River, Lyangar foothills) and Darvaz (Wandsch River and Fort). Type and paratype in Leningrad.

Note. This species serves to a certain degree as a connecting link between species of the two cycles which compose the present subsection, and in particular between species of the type *A. biflora* (*A. gortschakowii*, *A. oligotoma*) and *A. tschernjaewii*.

28. *A. tschernjaewii* (Tschernaewi) Rgl. in A.H.P. VIII (1884) 690. — Ic.: Rgl., l.c., tab. XIV, f. 3, 1-o.

265 Perennial, 5–35 cm high; rootstock tuberous; radical leaves 1 or 2, with glabrous petioles, palmately trisected, the segments cuneate, broad-ovate, sessile, mostly shallowly and flabellately trifid, the lobules coarsely crenate-dentate with few teeth; stem glabrous, covered with small papillae above; involucre leaves 3, obovate, broadly cuneate, distally divided like segments of radical leaves, remotely appressed-pilose or glabrate; peduncles solitary or 2 or 3, slender, long, appressed-pilose, the lateral with involucres of 2 smallish leaves; flowers 1.8–3.5(–4) cm long; tepals 5, divaricate, whitish or pink or pale violet, ovate-oblong or oblong-lanceolate, subacute or obtuse; anthers linear-oblong, purple (sometimes yellow?); ovaries densely pilose; styles purple, in fruit about as long as the ovary. March–May. (Plate XVI, Figure 6).

Mountains at 900–1,800 m, in scrub and forest thickets with well developed herbaceous cover, and on shrubby steppe slopes. — Centr. Asia: Pam.-Al. Endemic. Described from Ura-Tyube and various localities in Tadzhikistan. Type and paratype in Leningrad.

29. *A. serawschanica* Kom. in Trav. Soc. Nat. Pétersb. XXVI (1896) 49.

Perennial, 6–25 cm high; rootstock tuberous; radical leaves long-petioled, 2, rarely 3, trisected, the segments shortly trilobate, with entire or usually 2–3-toothed lobules and large crenate teeth; stems slender, flexible, glabrous, distally somewhat roughened by small papillae; involucre leaves 2 or 3, sessile, obovate or rhombic, cuneate, tripartite, with apically crenate-dentate lobes, glabrous; peduncles 1–3, the middle one 2–3 times as long as the others, with small 2-leaved involucres, all peduncles slender, flexuous, rather sparsely pilose; flowers 1.2–1.8 cm in diameter; tepals 5, narrowly elliptic or ovate, obtuse, yellowish green, persistent, after flowering pale yellow sometimes reddening on the outside later, glabrous on both surfaces; anthers obcordate-obovate, yellow; ovaries glabrate; styles as long as ovaries, glabrous, in fruit half as long as ovaries; fruitlets covered with a silvery wooly hair 1.5 times fruitlet width. April to beginning of May.

Mountains at 1,200–1,800 m, in shady rock fissures beneath trees, and among stones and rock debris. — Centr. Asia: Pam.-Al. (Zeravshan). Endemic. Described from the Zeravshan Valley, from the villages of Shink, Mogian, Kshtudak, Madm, Artuch, etc. Type and paratype in Leningrad.

Section 2. *ANEMONOSPERMOS* DC., Syst. I (1818) 208, sensu ampl. — Rootstock not tuberous; flowers solitary; fruitlets with a dense ring of shorter rigidulous hairs below base of style; style strongly curved, with a capitate stigma.

266 Subsection 1. *BREVISTYLAE* Ulbr. in Engl. Bot. Jahr. XXXVII (1906) 205. — Rather large plants with large flowers; fruitlets oblong, pedunculate; style short, shorter than mature ovary.

The USSR representatives of this subsection compose one series, which may be called *Silvestres* Juz. The other series, *Rupicolae* Juz., grows in the Himalayas.

30. *A. silvestris* L., Sp. pl. (1753) 540; Ldb., Fl. Ross. I, 16; Kryl., Fl. Zap. Sib. V, 1160. — *A. hirsuta* Gilib., Fl. Lithan. II (1781) 276. —

A. alba Juss. in Ann. Mus. Paris III (1804) 248-249. — Ic.: Bot. Mag. II, tab. 54 (1788); Juss., l.c., tab. 20, fig. 1; Rchb., Ic. Fl. Germ. IV, tab. 50.

Perennial, 15-50 cm high; rootstock strong, vertical or oblique, brown-black, covered with fibrous roots; stems erect, pubescence as on petioles becoming denser above and almost white-tomentose; radical leaves 2-6, long-petioled, with a dense pubescence of soft long mostly erect-spreading hairs. palmately 3-5-sect, the segments rhombic or narrow-rhombic, trifid to less than half their length, with irregularly, often doubly subacutely or acutely incised-dentate lobules; leaf blade with scattered hairs above, more or less densely hairy beneath; involucral leaves 3, usually above middle of stem, their petioles 1-2 cm, more or less erect, trisected, the segments sessile, narrowly obovate in outline, cuneate, acute, the lateral segments bipartite, their lobes, as also the middle segment, shallowly trifid, the lobules with few large mostly acute apical teeth; peduncles solitary, long, densely appressed-pilose; flowers 3.5-7 cm in diameter; tepals mostly 5, elliptic or broad-obovate, pure white or slightly violet on the upper side, densely appressed-pilose below; tepals many times as long as the yellow stamens; pistils ovate-orbicular; fruitlets numerous, small, to 3 mm long, flattened, with a densely tangled white tomentum and a short beak. Fl. May-June. (Plate XVI, Figure 7, a-b).

Dry open hills, dry (mostly steppe) meadows, fallow land, open coniferous forests and forest margins, scrub, stony bluffs, and especially richly calcareous or sandy soil. — European part: all regions except L. V. (?); Caucasus: Cisc., Dag.; W. Siberia: Ob (as far north as Tobol'sk), U. Tob., Irt., Alt.; E. Siberia: Yenis., Ang.-Say., Dau., Lena-Kol. (S. part as far north as Vilyuisk); Far East: Kamch. ? Ze.-Bu., Uss. (middle Amur); Centr. Asia: Balkh. **Gen. distr.:** Scand., Centr. Eur., S. Eur. (locally), Mong., Manchuria? Described from Germany. Type in London.

Note. The following characters are reported for *A. alba* Juss. described from Siberia (vicinity of Chita), distinguishing it from the authentic *A. silvestris*: lower growth of the whole plant, a slighter
267 pubescence on its green parts, and smaller flowers with broader obtuse tepals. However, these characters are far from constant in the Siberian plant,

31. *A. ochotensis* Fisch., Cat. hort. Gorenk. (1812) 47 (nomen); Pritzel in Linnaea XV (1841) 637 (diagn., sub *A. silvestris* β *A. ochotensis* Fisch.).

Perennial, 5-22 cm high; rootstock almost creeping; radical leaves with rather slender petioles bearing isolated or scattered erect-spreading hairs or glabrous, trisected, the sessile segments ciliate-margined, otherwise glabrous or glabrate, glaucescent when dry; stems rather slender, remotely pilose below and rather sparsely pilose above; involucral leaves with rather long petioles, trisected into narrow segments, these less deeply trifid than in *A. silvestris*, the lateral segments bifid, the middle segment usually entire, the latter and the lobules of the lateral segments with few acute teeth; peduncles solitary, appressed-pilose; flowers 2-4 cm in diameter, smaller than in *A. silvestris*; tepals 5, obovate; fruitlets ca. 2.5 mm long. In other characters resembling *A. silvestris*. June.

Mountain shortgrass meadows and river valleys. — E. Siberia: Lena-Kol. (N.). Endemic. Described from Siberia after specimens raised from seeds collected by Langsdorf "inter Okotsk et Jakutzk." Type in Leningrad.

Subsection 2. **PARVIFLORA** Ulbr. in Engl. Bot. Jahrb. XXXVI (1905) 204. — Smallish monanthous plants; flowers smallish; tepals white; fruitlets ovate, sessile; styles as long as or longer than the ripe ovaries.

32. *A. parviflora* Michx., Fl. Bor. Amer. I (1803) 319; Ldb., Fl. Ross. I, 16; Kom., Fl. Penins. Kamtsch. II, (1929) 132. — *A. borealis* C.A.M. in sched. (an Richards.?). — Ic.: Britt. et Brown., III. Fl. N. St. et Canada II (1897) 62; S. Brown, Alp. Fl. Rocky Mount. (1907) tab. 24.

Perennial, 4.5–16 cm high; rootstock long-creeping, rather slender, covered with scales; radical leaves with rather short glabrous petioles, ternate with sessile broadly obovate cuneate-based segments, the lateral bifid almost to the middle, the middle segment 3-cleft into retuse lobules with 2–4(–6) obtuse rounded teeth (crenules); leaf blade glabrous; stems mostly with rather sparse soft crisp hairs; involucre leaves 3, usually below middle of stem, subsessile, obovate, tripartite, with oblong obtuse entire or apically slightly dentate lobes; peduncles solitary, very long, rather densely tomentose; flowers 2–3.5(–4) cm in diameter; tepals 6, ovate-oblong or broad-ovate, white, densely appressed-pilose on the outside, three times as long as the yellow stamens; fruits acuminate, densely tomentose, forming a globose head.

Tundra. — Arctic: Chuk.; Far East: Kamch. (Karaginskii Island).

Gen. distr.: N. Am. Described from the shores of Hudson Bay. Type in Paris.

Note. According to Ulbrich, the Arctic form of this species encountered in the USSR is distinguished from the typical (more southern form by its larger flowers, and is designated by Ulbrich as *A. parviflora* var. *β grandiflora* Ulbr., l.c., p. 251. It is possible that this form will eventually be considered as a variety.

Subgenus 5. **ANEMONIDIUM** Spach, Hist. nat. des végét. Phanér. Bd. VII (1839). — Plants with numerous long roots producing profuse adventitious buds for vegetative propagation; involucre usually 2-leaved; inflorescence profusely branched: lateral branch arising from axil of one of the involucre leaves, similar to the main shoot in its development, the lateral branch also with a 2-leaved involucre producing axillary shoots, etc.; tepals 5–6; fruitlets glabrous or slightly pilose, with thick wings and with a rather long straight or apically slightly curved beak.

33. *A. dichotoma* L., Sp. pl. (1753) 540; Kryl., Fl. Zap. Sib. V, 1161. — *A. pensylvanica* Ldb., Fl. Ross. I, 17, non L. — *A. pensylvanica β laxmanni* DC., Prodr. I (1824) 1921. — Ic.: Rev. Gen. Bot. IV (1892) tab. 13.

Perennial, 30–80 cm high; rootstock horizontal, slender, black-brown; stem erect, dichotomously branching, rarely simple, with rather sparse short appressed hairs in upper part; leaves opposite, sessile, one pair at each point of bifurcation of stem, tripartite to two-thirds or three-fourths, lobes oblong or broad-lanceolate, coarsely incised-dentate in upper part with few scattered teeth; lateral lobes strongly declinate from the middle lobe; leaves appressed-pilose along the margins and beneath; flowers on

long pedicels solitary, 2–3 cm in diameter, arising from bifurcations of the stem or from leaf axils; pedicels covered with short appressed hairs; tepals 5, elliptic, white or sometimes reddish beneath, finely appressed-pilose on the outside; stamens half as long as tepals; fruitlets ca. 4 mm long, obliquely ovate, compressed. June–July.

Flooded and damp forest meadows, grassy bogs, damp scrub, and sparse forests. — European part: V.-Kama, Transv.; W. Siberia: Ob, Alt., Irt.; E. Siberia: Yenis., Ang.-Say., Lena-Kol., Dau.; Far East: Ze.-Bu., Uss., Uda, Okh., Kamch., Sakh. **Gen. distr.:** Jap.-Ch. (Hokkaido, N. Korea), N. Mong. Described from Siberia. Type in London.

269 Subgenus 6. **HOMALOCARPUS** DC., Syst. I (1818) 212. — Plants biaxial: distinct from other subgenera by flower-bearing shoot not terminal but lateral, arising from axil of a squamiform or herbaceous leaf; radical leaves in a rosette; involucre of 4 cruciformly arranged leaves; in USSR species (related to the group *Involucratae* Ulbr.) inflorescence umbelliform, the flowers without individual prophylla; fruitlets large, strongly flattened, always quite glabrous, surrounded by a broad delicate winglike border, with a short apical beak and a sometimes somewhat curved style.

The USSR representative of this group, usually included in *A. narcissiflora* L., form a series of vicariant species which replace one another in their respective ranges of distribution; some of these are distinctly separated whereas others are not; the latter have rather rare intermediate forms probably mostly due to hybridization. The work of N. V. Shipchinskii* was devoted to a study of the varieties of the collective species *A. narcissiflora*; this work has been partly followed, but most of the varieties recognized by N. V. Shipchinskii are considered as separate species; also, we have further divided the "variety" *A. n. var. linnaeana* Schipcz. In order to establish an exhaustive system for this complicated and critical group, further detailed study is needed.

Series 1. *Narcissiflorae* Juz. — *A. narcissiflora* L., Sp. pl. (1753) 542 s. ampl. — Flowers in a simple umbel; leaves usually palmatisect.

34. *A. laxa* (Ulbr.) Juz., comb. nova. — *A. narcissiflora* subsp. *typica* var. *genuina* f. *laxa* Ulbr. in Engl. Bot. Jahrb. XXXVII (1906) 266 p.p. — *A. n. var. γ laxa* Schipcz. in A. H. B. Univ. Juriev. XIII (1912) 99. — *A. narcissiflora* Bess., Enum. pl. Volh. (1822) 22; Ldb., Fl. Ross. I, 18 p.p.

Perennial; stem 20–100 cm high, slender, erect, like petioles of radical leaves covered with dense horizontally spreading usually conspicuously reclinate rather short hairs; radical leaves suborbicular, 5-sect, with sessile broad-rhombic or almost square segments, these tripartite to three-fourths, their rhombic lobules 2–3-fid to the middle with rather broad cuneate-triangular, apically deeply incised-dentate lobules and with narrowly triangular subobtusate teeth, the lateral teeth cordately curved,

* N. V. Shipchinskii: O formakh [Concerning the Forms of] *Anemone narcissiflora* L., Tr. Bot. Sada. Yur'evsk. Univ., XIII, No. 2 (1912), pp. 85–103, with 2 maps.

frequently overlapping adjacent segments; leaf blade with few hairs or glabrate above and with a scattered or usually rather dense pubescence or
270 shortish spreading hairs [beneath], margins short-ciliate, involucre leaves relatively small, sometimes rather large, tripartite to three-fourths, the lobes 2-3-fid in upper third or to below the middle, the lobules entire, subacute or acute, or 2-3-incised-dentate at the apex with acute teeth, the lateral teeth usually arcuately curved, pubescence as on radical leaves; peduncles 3-6, slightly longer or usually 3-4 times as long as the involucre leaves, slender, often flexuous, especially above covered with very dense erect-spreading hairs or with almost accumbent hairs, elongating very considerably in fruit; flowers of medium size, 2-3 cm in diameter, the tepals obovate, white, occasionally slightly pinkish, pilose on the outside mainly along a median line; fruits relatively small, 5-7 mm long. May-June, and again in August. (Plate XVII, Figure 1).

Oak forest margins, forest meadows, and scrub. — European part: M. Dnp. (former Kremenets and Zaslavl' counties). Gen. distr.: Poland. Described from Volhynia (former Zaslavl' County, Skalozubov). Type in Leningrad.

Note. This variety is very close to the authentic *A. narcissiflora* L. s. str., distributed in the mountains of western Europe and in turn, separated from the high-mountain *A. dubia* Bell.

35. *A. fasciculata* L., Sp. pl. (1753) 542. — *A. narcissiflora* β fasciculata DC., Syst. I (1818) 213. — *A. narcissiflora* α elata C. A. M., Verz. Kolen. (1849) 54. — *A. n.* var. β caucasica Schipcz. in A. H. B. Univers. Juriev. XIII (1912) 99. — *A. umbellata* auct. fl. Cauc., non Willd. (neque Lam.); Grossg., Fl. Kavk. II, 105. — *A. narcissiflora* Ldb., Fl. Ross. I, 18 p.p.; N. Busch in Fl. Cauc. crit. III, 3 (1902) 92 salt. pro max. parte. excl. var., non L. — Ic.: Tourn., Voy. 2 (1717) 245. — Exs.: Fl. Cauc. exs. No. 156 (s. nom. *A. narcissiflora*); Herb. Fl. Cauc. No. 355 (sub nom. *A. umbellata*).

Perennial; stem 15-50 cm high, erect, like petioles of radical leaves covered with dense rather short horizontally spreading or reclinate hairs; radical leaves long-petioled, rounded-reniform in outline, almost 5-sect, segments sessile or on short but rather conspicuous petiolules, broad, tripartite to below the middle, the lobes usually trifid to the middle, the lobules usually incised-dentate with relatively numerous oblong-lanceolate subacute straight teeth; leaf blade usually densely pilose along the veins above, remotely to rather densely pilose over the entire surface beneath, margins short-ciliate; involucre leaves large, tripartite and dissected with elongated straight subacute teeth, pubescence as on the radical leaves; peduncles 3-8, not longer than or only twice as long as the involucre leaves, in fruit usually ca. 3 times as long, covered with rather dense erect-
271 spreading or loosely accumbent hairs; flowers large, 2.5-4 cm in diameter; tepals obovate or elliptic, subobtusate or rounded, white or sometimes pink or purple (var. *rosea* Trautv.), often colored only on the outside, also on the outside usually more or less pilose proximally and along median line; fruit relatively small, 6-7.5 mm long, broadly ellipsoid or subglobose. May-July. (Plate XVII, Figure 2, a-b).

Alpine, particularly subalpine meadows and pastures, rocks, and margins of mountain forests. — Caucasus: Cisc., Dag.; E. Transc., W. Transc.

(Krasnaya Polyana), S. Transc. (Lake Gokcha). **Gen. distr.:** Turkish Armenia. Described from Turkish Armenia between Trebizond and Erzerum. Type in Paris.

Note. The identification by Caucasian botanists of the Caucasian plant described above with *A. umbellata* Willd. is based on an obvious misunderstanding (see especially the description of *A. umbellata* by De Candolle in Syst. I (1818) 213–214). On the other hand, its identity with the forgotten Linnaean species *A. fasciculata* L. is almost certain due to the excellent illustration and description of the latter by Tournefort.

36. *A. impexa* Juz., sp. nova in Addenda VI, p. 566. — ? *A. umbellata* Willd., Sp. pl. II (1799) 1284, non Lam.

Perennial; stem 12–45 cm high, erect, often somewhat flexuous, stem and petioles of radical leaves covered with more or less dense erect-spreading or loosely accumbent soft hairs; radical leaves with somewhat flexuous petioles, suborbicular or triangular, trisected, the segments short-petiololed, cuneately obovate to rhombic, deeply (the lateral almost to base) 2–3-partite, the very narrow lobes deeply 2–3-fid in upper half, with entire linear-lanceolate or linear acute lobules; leaf blade glabrous above, glabrous or remotely pilose beneath, margin remotely or rather densely short-ciliate; involucre leaves smallish, parted to two-thirds or three-fourths into lanceolate or narrow-lanceolate entire acute lobes, with a pubescence as on radical leaves or else rather densely pilose beneath; peduncles 3 or 4, at flowering as long as or 3 times the length of the involucre leaves, covered with accumbent hairs; flowers 2–3.5 cm in diameter; tepals obovate, white or on the outside pink, on the outside pilose mainly along median line; fruit unknown. June–July.

Alpine meadows. — Caucasus: S. Transc. (Alagez [Aragats]). **Gen. distr.:** Turkish Armenia. Described from Mt. Alagez, Dali-chai River source, Khadzhi-mugum-yurt natural boundary area. Type in Leningrad.

Note. The published descriptions of the authentic *A. umbellata* Willd., specimens from Cappadocia which we have not seen, tally well with our plant; however, the illustration of the specimen of *A. umbellata* Willd. in Delessert, Ic. Pl. I (1820) tab. 18, can hardly be identified with it. In any case, the name *A. umbellata* cannot be retained for either of these two plants, since it was earlier employed by Lamarck (*A. umbellata* Lam. is a European plant identical with the authentic *A. narcissiflora* L.).

37. *A. biarmiensis* Juz., sp. nova in Addenda VI, p. 567. — *A. narcissiflora* var. *uralensis* Schipcz. in A. H. B. Univers. Jurjev. XIII (1912) 100. — *A. narcissiflora* Ldb., Fl. Ross. I, 18 p.p. — Russian name: vetrenitsa permskaya [Permian].

Perennial — stem 15–65 cm high, erect, covered, like the frequently strongly elongated petioles of radical leaves, with rather dense relatively short horizontally spreading, usually somewhat reclinate hairs; radical leaves rounded-reniform in outline, trisected, their segments with well developed frequently rather long (to 1.2 cm, in very large specimens to 2 cm) petiolules, broad-rhombic, the lateral bipartite almost to base, the middle segment less deeply (but usually to below the middle) tripartite, with rather

broad lobes 2-3-fid to the middle and with oblong entire, as a rule apically rather deeply and irregularly 2-4-incised-dentate lobules, with straight, sometimes curved, usually subacute, rarely subobtuse teeth, the leaf blade mostly glabrous or glabrate above, with usually scattered, occasionally rather dense relatively short hairs beneath; involucre leaves usually parted to two-thirds, their lobes sometimes entire, as a rule apically 2-3-fid with straight oblong digitate subacute or obtuse lobules, the leaf blade usually somewhat more strongly pilose than in radical leaves; peduncles 2-6 (very rarely one), at beginning of flowering about as long as but subsequently several times as long as involucre leaves, greatly elongating in fruit, usually covered with rather sparse slender often somewhat crisp erect-spreading hairs; flowers smallish or of medium size, 1.8-3 cm in diameter; tepals elliptic or obovate, mostly narrowed at both ends, white, glabrous on both surfaces; fruitlets rather large, ca. 7 mm long. July-August. (Plate XVII, Figure 3, a-b).

Mountain forests, scrub, taluses, and open herb-covered slopes in the forest and alpine zones of the Urals. — European part: Ev.-Pech. (Pechora River), V.-Kama; W. Siberia: Ob. Endemic. Described from Mt. Yurma (former Perm Province). Type in Leningrad.

Note. *A. biarmiensis* varies considerably at its growth, in degree of leaf dissection, and to some extent also in number of flowers; yet in the Urals there seems to be no evidence for clear differentiation into vicarious varieties replaying each other in a vertical direction, such as occurs within *A. biarmiensis* in the Caucasus (*A. fasciculata* L. and *A. speciosa* Adams), in the Sayans and in Transbaikalia (*A. crinita* Juz. and *A. sibirica* L.).

38. *A. protracta* (Ulbr.) Juz., comb. nova. — *A. narcissiflora* f. *cinereoopilosa* Franchet, Mission Capus (1883) 5. — *A. n.* subsp. *typica* var. β *protracta* Ulbr. in Engl. Bot. Jahrb. XXXVII (1906) 266. — *A. n.* var. *turkestanica* Lipsky in sched.; Schipcz. in Acta H. B. Univers. Jurjev. XIII (1912) 101 p.p.

Perennial; stem 7-60 cm high, stem and petioles of radical leaves covered with dense loosely accumbent or appressed hairs; radical leaves cordate-ovate or almost triangular in outline, trisected into broad-rhombic segments, the lateral subsessile, the middle segment exceeding the lateral, with a more or less well developed petiole 2-15 mm long (sometimes half as long as the segment), deeply 2-3-pinnatifid, their lobes 2-3-fid, with entire, as a rule apically 2-3-toothed lobules and with obtuse, sometimes subacute teeth; leaf blade remotely pilose or glabrate above, covered with rather dense accumbent hairs beneath; involucre leaves smallish, reduced, tripartite to the middle or somewhat deeper, with entire, rarely 2-3-toothed lobes; peduncles (1-)2-5, appressed-pilose; flowers 1.5-4 cm in diameter; tepals broad-elliptic or broad-obovate, white, more or less pilose beneath, but frequently with only few hairs in central part and at base; fruitlets ca. 6 mm long, broadly ellipsoid. End of May through July. (Plate XVII, Figure 4).

Subalpine and alpine zones: forest and scrub margins; forest, subalpine and alpine meadows, and grass glades; rocks and rock streams. — Centr. Asia: T. Sh., Pam.-Al. Gen. distr.: Kashgaria. Described from Central Asia. Type in Leningrad.

Note. This is one of the most distinctive varieties of the collective species *A. narcissiflora*. N. V. Shipchinskii (l.c., p. 101) has compared it with *A. demissa* Hook. et Thoms.

39. *A. schrenkiana* Juz., sp. nova in Addenda VI, p. 738. — *A. narcissiflora* var. λ *turkestanica* (f. *contracta* et f. *protracta*) Schipcz. in Acta H. B. Univers. Jurjev. XIII (1912) 101 p.p. — ? *A. n.* var. ζ *yuldussica* Schipcz., l.c., p. 100.

Perennial; stem 8–45 cm, erect, straight or somewhat curved, stem and petioles of radical leaves covered with very dense long strongly reclinate hairs; radical leaves with short somewhat arcuately curved or long straight petioles, broadly triangular-ovate in outline, trisected into broad segments, the lateral sessile or short-petioluled, the middle segment almost always with a conspicuous, sometimes rather long (to 1 cm) petiolule; lateral
274 segments 2(–3)-partite almost to base, lobes 2–3-incised with entire or 2–3-toothed lobules, the middle segment almost pinnately doubly tripartite and trifid, the lobules entire or dentate and, like the teeth, subobtuse or obtuse; leaf blade glabrate above and covered beneath with long loosely accumbent or distant hairs; involucre leaves smallish, parted to about two-thirds into entire or apically 3-incised-dentate lobes, these subobtuse or obtuse like the teeth, the leaf blade usually densely pilose beneath; peduncles several, 2–4 times as long as involucre leaves, covered with erect-spreading slightly crispate hairs; flowers smallish or of medium size, 1.7–3 cm in diameter; tepals elliptic, narrowed at both ends, white, glabrous beneath, sometimes pilose at base and along median line; fruits smallish, ca. 6 mm long, broadly ellipsoid. Second half of June, July.

Meadows and grass glades in the forest and alpine zones. — Centr. Asia: Dzu-Tarb. Gen. distr.: Chinese Dzungaria. Described from the Dzungarian Ala Tau. Type and cotype in Leningrad.

Note. Geographically as well as morphologically this plant assumes an intermediate position between *A. protracta* and *A. crinita* Juz.; it may be that its only unique character is the pubescence of exclusively retrorse hairs on stem and petioles.

40. *A. crinita* Juz., sp. nova in Addenda VI, p. 568. — *A. narcissiflora* (sphalm. *narcissifolia*) L., Sp. pl. (1753) 542 p.p.; C.A.M. in Ldb., Fl. Alt. II (1830) 366; Ldb., Fl. Ross. I, 18 p.p.; Turcz., Fl. baic.-dah. I, 43 p.p.; Kryl., Fl. Zap. Sib. V, 1162 pro max. parte. — *A. narcissiflora* var. α *linnaeana* Schipcz. in A. H. B. Univers. Jurjev. XIII, 2 (1912) 98 p.p.

Perennial; stem 12–45 cm high, strong, erect, stem and petioles of radical leaves covered with very dense and long horizontally spreading and reclinate hairs; radical leaves with long petioles their broadened base covered with dense almost accumbent somewhat sericeous hairs, the leaf blade rounded-reniform in outline, 3- or usually (almost) 5-sect with broad segments, these sessile or the middle segment short-petioluled, three times 2–3-partite and terminating in linear-lanceolate straight or slightly curved subacute or acute teeth, the blade covered with long hairs, these dense beneath, particularly at the margins, scattered above, mainly along the veins; involucre leaves large, resembling radical leaves in type of dissection and

in shape of teeth, mostly densely long-pilose beneath, remotely pilose above; peduncles 3-5, covered with rather dense erect-spreading slender somewhat
275 crispate hairs, at flowering usually as long as or slightly longer than involucre leaves, in fruit 3 times as long as involucre leaves; flowers mostly large, 2-4 cm in diameter; tepals obovate or elliptic, white, glabrous on both surfaces; fruits large, 6-9 mm long, broadly obovoid or ellipsoid. June-July.

Mountains in subalpine and forest meadows, forest margins, herb-covered slopes, and more rarely mountain tundras. - W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau. **Gen. distr.:** N. Mong. Described from Altai. Type in Leningrad.

Note. This plant shows considerable variation and requires further study; a comparison of its Altai forms with its Sayan and Transbaikalian forms is particularly necessary. Closely connected with it is the critical *A. narcissiflora* ζ *lineariloba* Rgl. et Radde, a very distinctive low-growing and small-flowered apparently alpine form, known in the Sayan Mountains (Munku-Sardyk and the Tunkinskii District), with extremely narrowly linear leaf cusps and with very densely villous stems and petioles. This should perhaps be considered as an intermediate form between *A. crinita* Juz. and *A. sibirica* L. It should be noted that the Sayan *A. sibirica* is also frequently not fully typical and shows denser pubescence of stem and petioles, as well as strongly acuminate leaf cusps (teeth).

41. *A. villosissima* (DC.) Juz., comb. nova. - *A. narcissiflora* ζ *villosissima* DC., Prodr. I (1824) 22. - *A. narcissiflora* Ldb., Fl. Ross. I, 18 p.p. - *A. narcissiflora* var. α *linnaeana* Schipcz. in A. H. B. Univers. Jurjev. XIII, 2 (1912) 98 p.p.;

Perennial; stem 6-35 cm erect, strong; stem and petioles of radical leaves covered with extremely dense long hairs, these erect-spreading at first, subsequently almost horizontally spreading; radical leaves broad-
reniform or rounded-reniform in outline, 5-sect, with segments usually characteristically overlapping at the margins (as the lobes often are) and dissected to two-thirds, with lobes 2-3-fid to the middle and lobules deeply 2-3-incised-dentate with oblong straight subobtuse or obtuse teeth, covered on both surfaces with dense long hairs, along the veins the entire lower surface, in addition, frequently remotely or rather densely pilose, with very dense loosely accumbent long hairs at the margins, thus leaf segments and their parts appearing white-bordered; cauline leaves large, broad-rhombic, similar to radical leaves in type of dissection, shape of teeth and pubescence, but usually even more densely pilose, frequently
276 remotely pilose also above and between the veins; peduncles 3-6, at flowering usually as long as or very slightly shorter than involucre lenses, considerably elongating and frequently 3 times as long as involucre leaves in fruit covered with rather dense or dense erect-spreading or loosely accumbent soft somewhat crispate hairs; flowers large, 2.5-4.5 cm in diameter; tepals obovate or broad-obovate, glabrous on both surfaces; fruitlets large, 6-8 mm long. June-July.

Far East: Kamch. (Komandorskie Islands; related forms on east coast of Kamchatka). **Gen. distr.:** Aleutian Islands, Unalaska. Described from Unalaska Island. Type in Geneva; cotype in Leningrad.

Note. Kamchatkan forms are in most cases nontypical; they appear to be linked by intermediate forms with *A. sibirica* L., which is widely distributed in Kamchatka.

42. *A. sibirica* L., Sp. pl. (1753) 541; Ldb., Fl. Ross. I, 19. — *A. narcissiflora* var. *monantha* auct. mult. vix autem DC. —? *A. narcissiflora* δ *pedicularis* DC., Syst. I (1818) 213. — *A. narcissiflora* var. α *linnaeana* Schipcz. in A.H. Jurjev. XIII, 2 (1912) 98 p.p. — *A. narcissiflora* Ldb., Fl. Ross I, 18 p.p.; Turcz., Fl. baic.-dahur. I, 43 p.p., non L.

Perennial; stem 4–30 cm high, usually rather slender, often arcuately ascending, covered with rather sparse longish hairs pointing in various directions, usually densely pilose only at base, in upper part frequently quite glabrous, sometimes glabrous almost throughout, occasionally rather densely pilose throughout; radical leaves with frequently arcuately curved petioles that are pubescent like the stem, broad-reniform or almost semi-orbicular or rarely rounded-reniform in outline, trisected with segments sessile or on scarcely discernible petiolules, more rarely the middle segment with a rather conspicuous petiolule, the segments narrowly obovate to rhombic, the lateral bipartite almost to base, the middle segment trifid to the middle with narrow lobes and lobules and shallowly 2–3-incised-dentate or sometimes entire at apex, with oblong-linear or oblong-ovate acute or subobtusate tips, usually with rather sparse longish hairs confined to the margins, otherwise glabrous or remotely pilose; involucral leaves smallish, deeply (to about three-fourths) tripartite, the lobes entire, the middle lobe usually apically 3-incised or 3-toothed with subacute or obtuse lobes and teeth, rather densely pilose on both surfaces and at the margins
279 proximately more densely pilose, sometimes the entire lower surface rather densely pilose; peduncles 1–4(5), at beginning of flowering sometimes shorter than or as long as but usually considerably longer than involucral leaves, with a rather sparse thin tomentum or glabrate; flowers 1.5–3 cm in diameter; tepals ovate or obovate or broad-obovate, narrowed at both ends or rounded at apex, white, frequently somewhat yellowing on drying, glabrous on both surfaces; fruitlets 4–6 mm long. June–July. (Plate XVII, Figure 5).

Mountain tundras, alpine grass glades, and taluses and rocks in the alpine (balds) zone, only occasionally descending below this. — Arctic: Chuk., An.; E. Siberia: Ang.-Say., Dau., Lena-Kol. (S. and E.); Far East: Kamch., Okh., Uss. (N. Sikhote-Alin), Ze.-Bu. Gen. distr.: N. Mong., N. Am. (Alaska). Described from southern Siberia ("from the Yenisei to Transbaikalia," cf. Gmelin, Fl. Sibir. 4, p. 199). Type in the Linnaean Herbarium in London; cotype in Geneva (Herb. Delss.).

Note. A polymorphic plant, possibly requiring further division. In the southern part of the Lena-Kolyma area (along the Vitim, Vatoma, and Angara rivers) forms occur which link this species with *A. calva* Juz., and from Kamchatka, there are reports of plants linking it with *A. villosissima* (DC.) Juz.; there are also reports of forms intermediate between *A. sibirica* and *A. crinita* Juz. (see note to preceding species).

43. *A. calva* Juz., nom. nov. — *A. aconitifolia* Turcz. in Bull. de la Soc. Imp. Nat. Mosc. (1840) 61, non Michx. — *A. narcissiflora* ϵ *frigida* DC., Syst. I (1818) 213. — *A. narcissiflora* γ Ldb., Fl. Ross.



PLATE XVII. 1 - *Anemone laxa* (Ulbr.) Juz., radical leaf; 2 - *A. fasciculata* L., a) radical leaf, b) achene; 3 - *A. biarmiensis* Juz., a) radical leaf, b) upper part of stem; 4 - *A. protracta* (Ulbr.) Juz., radical leaf; 5 - *A. sibirica* L., radical leaf; 6 - *Hepatica nobilis* Garsault, habit.

118 p.p. — *A. narcissiflora* var. *α aconitifolia* Schipcz. in A.H.B. Univers. Jurjev. XIII (1912) 101.

Perennial; stem 14–35 cm [sic] high, slender, stem and petioles of radical leaves quite glabrous or with few hairs confined to base; radical leaves 3–5-palmatisect, their segments sessile or with very short petiolules, deeply and narrowly twice 2–3-partite, with entire oblong-linear or linear subacute or obtuse lobes, glabrous, occasionally with few hairs at the margins; involucre leaves smallish, tripartite to two-thirds, the lobes entire or the middle lobe usually 3-incised at the apex, all lobes obtuse, the leaf blade pilose above; peduncles 1–4, many times as long as involucre leaves, slender, glabrous; flowers smallish, 1.2–2 cm in diameter; tepals oblong-obovate, recurved at end of flowering, white, glabrous on both surfaces; fruitlets ca. 6 mm long, obovate. June–July.

Pine forests. — E. Siberia: Lena-Kol. (central part along the Aldan, Maya, and Vilui rivers, etc.). Endemic. Described from mountains along the Aldan River between Yakutsk and Okhotskoe. Type and cotype in Leningrad.

280 Note. A unique variety [sic], separated from all other representatives of the series by the extremely slight pubescence. See, however, the note to *A. sibirica* L. concerning intermediate forms.

44. *A. sachalinensis* (Miyabe et Miyake) Juz., comb. nova cfr. in Addenda VI, p. 569. — *A. narcissiflora* var. *villosissima* F. Schmidt Reisen etc. (1868) 104, non DC. — *A. narcissiflora* var. *α linnaeana* Schipcz. in A.H.B. Univers. Jurjev. XIII, 2 (1912) 98 p.p. — *A. narcissiflora* var. *sachalinensis* Miyabe et Miyake, Fl. of Saghalin (1915) 10.

Perennial; stem 15–35 cm high, rather strong, erect or somewhat curved; stem and petioles of radical leaves covered usually only with scattered or sparse horizontally spreading hairs, often glabrous in upper part; radical leaves suborbicular in outline, trisected, the segments with conspicuous petiolules, very broad, deeply 2–3-partite, the lobes twice incised, with oblong subobtuse or obtuse points, the leaf blade glabrous on both surfaces or with few hairs, short-ciliate margin; involucre leaves smallish, twice parted, with obtuse tips, remotely pilose on both surfaces; peduncles 2–5, elongating in fruit, 2–4 times as long as involucre leaves, rather sparsely or remotely pilose; flowers unknown; fruitlets 5–7 mm long. Fr. at end of July.

Stony habitats at mountain summits, in *Pinus pumila* thickets. — Far East: Sakhalin, Uda (Shantar Islands). Endemic. Described from Mt. Ktauzi-pal' (Pic de la Martinière) on Sakhalin Island. Type in Leningrad.

Note. A critical species, very close to *A. sibirica* L. and known to us from unsatisfactory material; the main differences from *A. sibirica* are its larger [dimensions], stronger growth, different shape of leaves, very conspicuous leaf segments, petiolules, and more obtuse leaf tips (teeth). In degree of petiolule development this species converges with the Ural species *A. biarmiensis* Juz., from which it differs in its smaller dimensions, its reduced pubescence of stem and petioles, and its lesser leaf dissection. Miyabe and Miyake described their variety in the Japanese language, with which we are not conversant; we were therefore forced to give an entirely original description based on different type material.

45. *A. brevipedunculata* Juz., sp. nova in Addenda VI, p. 569. — *A. narcissiflora* Kom. Fl. Mansh. II, I, 269, non L. — *A. narcissiflora* var. α *linnaeana* Schipz. in A.H.B. Univers. Jurjev. XIII, 2 (1912) 98 p.p.

281 Perennial; stems 16–35 cm high, erect; stems and petioles of radical leaves covered with rather short horizontally spreading or somewhat reclinate hairs, these frequently strongly reduced in distal part of stem and petioles; radical leaves rounded-reniform, usually orbicular in outline, 5-sect with sessile broad-rhombic segments deeply (to three-fourths) tripartite, their lobes 2–3-fid to the middle with entire, usually apically 2–3-incised-dentate lobules, these and the teeth subacute or acute; leaf blade usually slightly pilose only along the veins above, remotely pilose beneath, margin short-ciliate; involucre leaves of medium size or rather large, parted to three-fourths, the lobes distally 2–3-fid, with entire, sometimes 2–3-incised-dentate lobules, these and the teeth subacute, the leaf blade remotely pilose on both surfaces (above, mainly along the veins); peduncles 2–5, very short (0.5–2 cm), shorter than involucre leaves, scarcely elongated in fruit, covered with sparse erect-spreading slender hairs; flowers smallish, 1.5–2.5 cm in diameter; tepals narrowly elliptic or obovate, white, glabrous on both surfaces; fruitlets 5–7 mm long. June–July.

Broadleaf forests on mountain slopes. — Far East: Uss. (Ol'ga Gulf, Vladimir Gulf, Oprichnik Gulf, Ternei Bay). Endemic. Described from the Tyutikhe River valley and from the shores of Ol'ga Gulf. Type and paratype in Leningrad.

Note. A curious form with an apparently very limited range, undoubtedly closely related to *A. sibirica* L.

46. *A. speciosa* Adams in herb. Willd. ex Pritzel in Linnaea XV (1841) 685; Rupr., Fl. Cauc. (1869) 12, 286. — *A. narcissiflora* β *floribus aureis* C.A.M. Verz. Pfl. Cauc. (1831) 203; Ldb., Fl. Ross. I, 19. — *A. narcissiflora* var. *subuniflora* C.A.M. Verz. Kolen. (1849) 54; N. Busch in Fl. cauc. crit. III, 3 (1902) 95. — *A. narcissiflora* var. *chrysantha* C.A.M. in sched.; N. Busch, l.c. — *A. narcissiflora* subsp. *chrysantha* Ulbr. in Engl. Bot. Jahrb. XXXVII (1906). — *A. chrysopetala* Rupr. in sched. — *A. chrysantha* Grossh. Fl. Kavk. II (1930) 105. — Exs.: HFR No. 1.

282 Perennial; stems 6–20 cm high; stems and petioles of radical leaves with rather sparse or sparse horizontally spreading or reclinate hairs, in upper part frequently glabrate; radical leaves rounded-cordate in outline, trisected, their segments short-petioluled or sessile, rhombic or narrow-rhombic, cuneate, the lateral bipartite to below the middle, the middle segment trifid to the middle, with lobes and lobules sometimes entire but more often shallowly 2–3-incised-dentate, with teeth ovate or ovate-oblong, subacute or rather obtuse; leaf blade with sparse longish hairs mainly at the margins or glabrate; involucre leaves smallish, mostly trifid to the middle with oblong acuminate lobes, these usually entire, rarely 2–3-incised or -toothed. Peduncles 1–3(5), usually solitary, considerably longer than involucre leaves, covered with scattered erect-spreading hairs; flowers 1.5–3 cm in diameter, pleochroic; tepals from narrowly elliptic to broad-ovate, rounded, very often acute, golden-yellow (f. *chrysantha* C.A.M.) or sulfur yellow (f. *ochroleuca* Rupr. in sched.), occasionally

white (f. *albiflora* N. Busch in sched.), or pink (f. *rosea* Rupr. in sched.), glabrous on both surfaces; fruitlets ca. 5 mm long, very broadly elliptic. June–August.

Alpine meadows and pastures, rocks and taluses in the alpine zone. — Caucasus: Cisc., Dag., W. Transc. (Abkhazia, Mingrelia); also reported for S. Transc.? (Karabakh). Gen. distr.: Mt. Ararat? Described from the Greater Caucasus. Type in Berlin; cotype (?) in Leningrad.

Note. Detailed field observations of the floral varieties of this species and their distribution and behavior are required. Among other things, it should be mentioned that, according to N. A. Bush, Adams' plant from Goldbach's herbarium, contained in the BIN Herbarium — but designated "*A. narcissiflora*" — had pink flowers. The name *A. narcissiflora* β *subuniflora* C. A. M. (*A. subuniflora* Juz. in sched.) clearly refers to the white-flowered form; in our opinion, the two varieties established by C. A. Meyer are treated incorrectly in the works of N. A. Bush and Ulbrich. Finally there is the yellow-flowered form *A. chrysantha* (C. A. M.) Grossh. s. str.

Genus 527. **HEPATICA** * MILL.**

(Dill. ex L. Syst. ed. I (1735); Mill. Gard. Dict. Abridg. ed. 4 (1754); Moench, Meth. (1794) 216.

Involucral leaves mostly 3, strongly reduced, close to flowers, usually having the appearance of sepals; flowers always solitary, smallish or of medium size with 6–10 (rarely more) mostly rather narrow tepals; stamens numerous, spirally arranged; pistils pilose with a short straight style; fruitlets with a proximal pellucid white appendage (apophysis) that includes a droplet of oil and serves as a lure for ants (myrmecochory). Perennial herbaceous plants with a short, not thickened tuberous-fibrous rootstock; leaves forming a rosette, with more or less long petioles, simple, little segmented, mostly 3(–5)-lobed, with entire or coarsely dentate lobes; stems unbranched, arrow-shaped, arising from axils of radical leaves usually from scaly lower leaves (biaxial plant).

1. Leaves reniform in outline, trifid, with entire lobes; involucral leaves very close to flowers; tepals bluish-violet, rarely pink or white . . .
..... 1. *H. nobilis* Gars.
- 283 + 1. Leaves reniform-cordate in outline, tripartite with incised-dentate lobes; involucral leaves frequently rather remote from flowers; tepals white 2. *H. falconeri* (Thoms.) Juz.

Series 1. **Trilobae** (*Triloba*) Ulbr. in Engl. Bot. Jahrb. XXXVII (1906)

213. — Radical leaves (normally) trifid, with entire lobes.

Only one species in the USSR.

1. *H. nobilis* Garsault, Fig. Pl. Anim. Med. (1764) tab. 301; Descr. Pl. Anim. (1767) 189; Mill. Gard. Dict. ed. 8 (1768). — *H. triloba* Gilib. Fl. Lithuan. II (1782) 273; Ldb., Fl. Ross. I, 22. — *H. hepatica*

* From the Greek *hepar*, a liver.

** Treatment by S. V. Yuzepchuk.

Karst. Fl. Deutschl. (1883) 559. — *Anemone hepatica* L., Spec. pl. (1753) 538; Boiss. Fl. Or. I, 14. — *A. triloba* Stokes Bot. Mat. Med. III (1812) 243. — Ic.: Bot. Mag. I (1787) tab. 10; Rchb., Ic. Fl. Germ. IV (1840) tab. 47. — Exs.: Pl. Finl. exs. No. 215 653; Fl. exs. Austro-Hung. No. 1730.

Perennial, 5–15(–25) cm high; rootstock dark brown, with oblong-ovate grayish brown scales at the apex; radical leaves beginning to develop only after anthesis in spring, numerous, overwintering, coriaceous, reniform or broadly triangular in outline, cordate, trifid to the middle, lobes broad-ovate obtuse or acuminate, green above, usually more or less violet beneath, when young covered like the petioles with dense soft sericeous hairs (spreading on the petioles) but later pubescence obsolete; stems arrow-shaped, in axils of last year's leaves or scales, erect, mostly somewhat curved, with slender accumbent or mostly erect-spreading hairs, usually reddish or brown; involucral leaves 3, resembling sepals, to 1 cm long, sessile, ovate, subobtuse or obtuse, entire, remotely or rather densely appressed-pilose, disposed almost adjacent to flowers; flowers solitary, erect, to 2 cm in diameter; tepals 6–7(–10), narrow-ovate, rounded, bluish lilac (paler on the outside), occasionally pink or white, glabrous on both surfaces, caducous; stamens with white or pinkish filaments, anthers almost white with a reddish connective; stigmas capitate; fruitlets oblong, pilose, on a thickened convex peduncle. April–May. (Plate XVII, Figure 6).

Broadleaf forests, scrub, and more rarely open meadow areas. — European part: Kar.-Lap., Dv.-Pech. (Vologda), Lad.-Ilm., U. Dnp., U. V., V.-Kama (W.), M. Dnp.; Far East: Uss. Gen. distr.: Scand., Centr. Eur., Atl. Eur. (absent in England), Med., Jap.-Ch. (Manchuria, Korea, Japan (Honshu Island)). Described from W. Europe.

284 Note. Although rare in Europe, in the Far East, according to Ulbrich, forms predominate with completely rounded leaf lobes; however, my examination of the material does not confirm this observation. According to an oral communication of V. L. Komarov, the Far Eastern plant is distinguished by the different coloration of its flowers (pink or white). It is possible that it will eventually be separated as a distinct variety, but due to lack of accurate data, this is not at present feasible.

Economic importance. This plant was formerly considered to be of medicinal use as an astringent (*Herba hepaticae nobilis*); it was also used as a substitute for tea. Sometimes cultivated in gardens (frequently in its pink, double-flowering forms).

Series 2. **Angulosae** (*Angulosa*) Ulbr. in Engl. Bot. Jahrb. XXXVII (1906) 213. — Radical leaves 3(–5)-fid or -partite, with margins of lobes or lobules segmented. Only one species in the USSR.

2. *H. falconeri* (Thoms.) Juz., comb. nova. — *Anemone falconeri* Thoms. in Hook. Ic. Pl. IX (N. S. V.) (1852) tab. 899; Rgl. in A. H. P. VIII (1884) 691. — Ic.: Hooker, l. c.; Coventry, Wild flowers of Kashmir, ser. II (1927) pl. IV.

Perennial, 6–22 cm high; apex of rootstock with oblong scarious scales; radical leaves with long petioles covered with soft horizontally spreading

hairs, reniform-cordate, tripartite, villous at first but subsequently remotely pilose, their lobes rounded-rhombic, broadly cuneate, 2-3-fid with coarsely dentate and denticulate lobules or simply incised-dentate, with broad obtuse or slightly subacuminate teeth; stems arising from axils of scales, ascending or erect, as long as or longer than radical leaves, slender, rather weak, mostly flexuous, their pubescence similar to that of petioles but usually less pronounced; involucre leaves 3, rarely 4, sessile, narrow-ovate or oblong, subacute, entire, rarely with (usually 3) small acute apical teeth, appressed-pilose; pedicels more or less distinct, shorter or frequently longer than the involucre; flowers 1.3-2 cm in diameter; tepals 5, rarely 6, ovate-oblong, obtuse or subacute, white (occasionally reddish on the outside), glabrous or on the outside at base slightly appressed-pilose proximally; fruitlets narrowly oblong, gradually tapering toward apex, somewhat curved, angular, sericeous-pilose. April-June.

Stony mountain slopes. — Centr. Asia: T. Sh. (Trans-Ili Ala Tau, Tabulga-Su), Pam.-Al. (Archaty Pass). **Gen. distr.:** from Kuldja to Kashmir. Described from Kashmir.

285 **Note.** A plant from the Trans-Ili Ala Tau was described by E. Regel as a separate variety, *β semenovii* Rgl., l.c., p. 692, distinguished by its higher growth, by longer petioles, and by pedicels considerably longer than involucre leaves. That variety presumably represents a simple modification to shady localities).

Genus 528. **PULSATILLA*** ADANS.**

Adans., Fam. II (1763) 460.

Flowers always solitary, with 5-7 tepals; stamens mostly numerous, the outermost usually in the form of staminodal glands; pistils numerous, ovary unilocular, with 1 ovule and a long plumose style; fruitlets oblong, pilose, persistent, awnlike, plumose style [much] enlarged, many times as long as the fruitlet. Perennial herbaceous plants with a more or less long subterranean rootstock and a rosette of radical leaves; cauline leaves disposed in a whorl sometimes comprising 3 leaves resembling the radical, but generally much reduced, connate at their bases to form a campanulate involucre, more or less deeply parted into numerous lobes. Russian name: prostel.

Economic importance. These poisonous and medicinal plants contain the alkaloid anemonin, which has an irritating effect on the skin (similar to that produced by the Spanish fly). The plants are widely used in homeopathy. Species of the series *Pratenses* Juz., seem to be the source of an especially valuable substance, in particular *P. nigricans* Störck and *P. pratensis* (L.) Mill., other species reported as having medical importance are *P. patens* (L.) Mill. and *P. vulgaris* Mill. Some species are cultivated as ornamental garden plants.

* From the Latin *pulsare*, to thrust or jerk, i.e., this plant shakes in the wind as if it were being jerked about.

** Treatment by S.V. Yuzepchuk.

1. Involucral (cauline) leaves well developed, petiolate 1. *P. aurea* (N. Busch) Juz.
- + Involucral leaves reduced, proximally connate 1.
2. Stamens violet 2. *P. kostyczewii* (Korsh.) Juz.
- + Stamens yellow 3.
3. Leaves ternate, their lateral segments cleft 4.
- + Leaves pinnatisect or palmatisect, more rarely ternate with deeply dissected segments 5.
4. Involucral leaves covered with bronze-golden hairs 3. *P. vernalis* (L.) Mill.
- + Involucral leaves covered with white hairs 4. *P. chinensis* (Bge.) Rgl.
5. Plant flowering prior to appearance of leaves; flowers erect, widely gaping 6.
- + Plant flowering at time of appearance of leaves; flowers usually campanulate 11.
6. Leaves pinnatisect 7.
- + Leaves palmatisect, sometimes the middle segment petiolulate . . . 9.
7. Leaf segments parted, the lateral subsessile or with short petiolules 5. *P. halleri* (All.) Willd.
- + Leaf segments pinnatisect, with pinnatipartite segments of the second order; lateral segments of the first order with more or less long petiolules 8.
8. Involucral leaves parted into narrow-linear lobes, covered with dense long hairs 6. *P. grandis* Wender.
- + Involucral leaves deeply parted, their lobes oblong and pinnatipartite, covered with rather short hairs . . . 7. *P. turczaninovii* Kryl. et Serg.
9. Flowers violet 10.
- + Flowers yellow 10. *P. flavescens* (Zucc.) Juz.
10. Leaf segments broad; total number of teeth in leaf usually 10-30 (rarely more) 8. *P. patens* (L.) Mill.
- + Leaf segments narrow; total number of teeth per leaf usually 30-80 9. *P. multifida* (Pritz.) Juz.
11. Involucral leaves covered with long yellowish hairs; flowers gaping; radical leaves very shortly ovate or suborbicular in outline 11. *P. ajanensis* Rgl. et Til.
- + Involucral leaves covered with white hairs; flowers usually campanulate, very rarely widely gaping and then the radical leaves oblong 12.
12. Radical leaves pinnatisect, segments parted 13.
- + Radical leaves pinnatisect, segments bipinnatipartite 14.
13. Flowers pale blue-violet 18. *P. dahurica* (Fisch.) Spreng.
- + Flowers bright violet-red or dark purple 19. *P. cernua* (Thunb.) Bercht. et Op.
14. Radical leaves oblong in outline with numerous lateral segments; flowers frequently gaping 15.
- + Radical leaves ovate in outline with fewer lateral segments; flowers campanulate 17.
15. Flowers smallish, frequently gaping; tepals 12-15 mm long, 3-7 mm broad 12. *P. bungeana* C. A. M.

- 287 + Flowers of medium size, half-open; tepals 2-3 cm long; 0.6-1 cm wide 16.
16. Flowers violet 13. *P. tenuiloba* (Hayek) Juz.
- + Flowers pale yellow 14. *P. sukaczewii* Juz.
17. European plants; awns of fruit long (to 6 mm) 18.
- + Asiatic plants; awns of fruit short (2-3.5 cm), mostly stout 20.
18. Flowers mostly nutant, tepals with recurved apex 19.
- + Flowers mostly declinate or suberect, dark violet tepals with flat apex 17. *P. montana* (Hoppe) Rchb.
19. Flowers pale violet 15. *P. pratensis* (L.) Mill.
- + Flowers black-violet 16. *P. nigricans* Storck.
20. Caucasian plants with narrow linear-lanceolate leaf lobes and lobules 21.
- + Siberian and Central Asian plants with rather broad lanceolate or oblong leaf lobes and lobules 25.
21. Flowers yellow (sometimes reddening after flowering) 22.
- + Flowers violet 23.
22. Flowers suberect, with tepals reddening after flowering 21. *P. andina* (Rupr.) Woron.
- + Flowers nutant, tepals yellow, persistent after flowering 20. *P. albana* (Stev.) Bercht. et Presl.
23. Flowers nutant; tepals with apex recurved 24.
- + Flowers declinate or suberect; tepals with flat apex 24. *P. armena* (Boiss.) Rupr.
24. Leaf lobes and lobules very narrowly linear, almost filiform 23. *P. georgica* Rupr.
- + Leaf lobes and lobules broader 22. *P. violacea* Rupr.
25. Flowers narrowly campanulate, nutant; tepals with recurved apex 26. *P. campanella* Fisch.
- + Flowers broadly campanulate, declinate; tepals with flat apex 26. *P. ambigua* (Turcz.) Juz.

Subgenus 1. **PREONANTHUS** Ehrh. Beitr. IV (1789) 149. — Involucral leaves well developed, resembling radical leaves, short-petioled. Outer stamens normal, i. e., not transforming into nectaries (staminodes).

- 288 1. *P. aurea* (N. Busch) Juz., comb. nova. — *P. lutea* Rupr., Fl. cauc. (1869) 9 p.p. (quoad pl. caucas.), non Rchb.; Grossg., Fl. Kavk. II, 106. — *A. alpina* var. *sulphurea* Ldb., Fl. Ross. 1, 19; Boiss., Fl. Or. I 11 et Suppl. 3, non DC. — *A. alpina* var. *aurea* Somm. et Lev. in A.H.P. XVI (1900) 2. — *A. alpina* subsp. *aurea* N. Busch in Fl. Cauc. crit. p. III, fasc. 3 (1902) 97. — *A. aurea* N. Busch in Fom. et Woron., Opred. rast. Kryma i Kavk. II, 4 (1919) 34. — Exs.: HFR No. 751. Fl. orient. No. 206.

Perennial, 6-35 cm, in fruit to 50 cm high; rootstock strong, vertical; stems erect, hairs spreading; radical leaves with long rather slender often somewhat flexuous petioles covered with spreading hairs, ternate with ovate pinnatisect long-petioluled segments, with pinnatipartite subdivisions and with acute deeply incised-serrate-dentate lobes; leaf long-pilose beneath along the main veins, glabrous above; involucral leaves

3, resembling the radical leaves but somewhat smaller, with short almost winged densely pilose petioles; peduncles long, tomentose; flowers sub-erect, 3.5–6 cm in diameter; tepals 6, divaricate, 2–3 cm long, 0.8–2 cm broad, ovate, golden yellow, mainly appressed-pilose on the outside, becoming glabrous at the edges, many times as long as the numerous yellow stamens; in fruit, receptacle hemispheric, slightly pilose; fruits to 5 mm long, pilose, with a flexuous awn (style) to 5 mm long covered with rather short erect-spreading apically almost accumbent hairs. June–July (–September).

Alpine pastures, subalpine meadows, and rhododendron thickets. – Caucasus: Cisc. (Main Range, western part), W. Transc. Endemic. Described from Svanetiya. Type in Florence.

Subgenus 2. **IOSTEMON** Juz., subgen. nov. – Involucral leaves basally connate, strongly reduced; involucre campanulate; flowers mostly with 5 broad rounded tepals; stamens violet or dark purple, the outer ones normal, i. e., not metamorphosed into nectaries.

2. *P. kostyczewii* (Korsh.) Juz., comb. nova. – *A. kostyczewii* Korsh. in Mem. Ac. Sc. St. Pétersb. IV, No. 4 (1896) 99. – Ic.: Korshinsky, l. c., tab. 1.

289 Perennial, 12–20 cm high; rootstock very strong distally, covered with fibrous remnants of leaves; radical leaves appearing together with flowers, biternately dissected, their segments entire linear, else 2–3-cleft into entire or linear lobes, ca. 0.5 mm broad; stem, petioles, and leaf blade covered with dense soft white hairs; involucral leaves repeatedly palmately parted into very narrow entire or bifid lobes; peduncles long, 6–10 cm; flowers large, 5.5–6 cm in diameter, erect; tepals ca. 3 cm long, 2 cm broad, obovate, the inner with rounded the outer with subacute apex, pink, villous on the outside, persistent in fruit; stamens one-third as long as tepals; filaments purple; anthers ovate-cordate, violet; fruitlets with a long (4–5 cm) flexible plumose awn. June, fr. July. (Plate XVIII, Figure 1).

Rocks and stony places. – Centr. Asia: Pam.-Al. (foothills of the Trans-Alai Range). Endemic. Described from the vicinity of Daraut-Kurgan and Cape Kara-aigyr. Type and paratype in Leningrad.

Subgenus 3. **CAMPANARIA** Endl. Gen. (1839) 845. – Involucral leaves reduced, basally connate; involucre campanulate; tepals mostly 6; stamens in USSR species yellow; outer stamens metamorphosed into capitate staminodal nectaries.

Series 1. **Vernales** Juz. – Plants flowering before appearance of radical leaves; leaves overwintering, trisected, with a petiolulate middle segment and incised lateral segments; involucral leaves with bronze-golden hairs; flowers half-open.

3. *P. vernalis* (L.) Mill., The Garden Dict. ed. VIII (1768) No. 3. – *A. vernalis* L., Sp. pl. (1753) 538. – *A. alborosea* Gilib., Fl. Lithuan. II (1781) 276. – *A. sulphurea* All., Fl. Pedem. II (1785) 170,

non Lam.— Ic.: Fl. Dan. I, tab. 29; Rchb., Ic. Fl. Germ. IV, tab. 54.— Exs.: Fl. exs. Austro-Hung. No. 2058; Meinsh., Herb. Fl. Ingr. No. 913.

Perennial, 5–20 cm high; rootstock strong, oblique, blackish, multicapital; stem mostly ascending, straight or somewhat curved, squarrose-pilose; radical leaves appearing after flowering, overwintering, with short or rather long, rather sparsely pilose petioles, ternate with sessile lateral segments and a petiolulate middle segment; segments obovate, cuneate, the lateral bifid, the middle segment tripartite, the lobules and lobes with few large subacute teeth; leaf blade coriaceous, remotely pilose or glabrate, principle and lateral veins strongly concave above; involucreal leaves with narrow-linear lobes densely covered with long bronze-golden hairs; peduncles short, greatly elongating in fruit; flowers nutant at first, subsequently erect, campanulate; tepals 6, 1.5–3.2 cm long, narrow-ovate, convergent at first, subsequently divaricate, on the inside white, on the outside a delicate violet color or pinkish or somewhat azure, and with a pubescence as on the involucreal leaves; stamens numerous, greenish yellow, half as long as tepals; fruitlets oblong produced into a 4-cm long awn, awn and fruitlets covered with yellowish hairs 3–5 mm long. May–June. (Plate XVIII, Figure 2).

Open pine forests.— European part: Lad.-Ilm. (Lembalovo). **Gen. distr.:** Centr. Eur., Scand., Atl. Eur. (Pyrenees), Bal.-As. Min. Described from Switzerland. Type in London.

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Series 2. **Chinenses** Juz.— Plants flowering after appearance of radical leaves; leaves trisected, with a petiolulate middle segment and incised lateral segments; involucreal leaves with white hairs; flowers campanulate.

4. **P. chinensis** (Bge.) Rgl., Tent. fl. Ussur. (1861) Kom., Fl. Mansh. II, I, 271.— **A. chinensis** Bge. in Mem. Ac. Sc. Pétersb. II (1832) 76.— Ic.: Pritzel in Linnaea XV, tab. V; Rgl., l. c., tab. II, fig. B.;

Perennial, 7–25 cm high; rootstock vertical or somewhat oblique, producing 1 or 2 stems; stems erect, their pubescence similar to but somewhat less dense than on petioles; radical leaves appearing before flowering, with long petioles covered with dense rather soft spreading hairs, broad-ovate or cordate in outline, ternate, with broad-obovate segments, the lateral subsessile, apically deeply 2–3-incised into rounded coarsely dentate lobules, the terminal segment long-petioluled, tripartite with frequently shallowly 2–3-incised lobes; leaf blade densely appressed-pilose beneath, remotely appressed-pilose above; involucreal leaves deeply tripartite, lobes mostly entire oblong, obtuse and with a small apical tuft of hairs; peduncles rather short, tomentose; flowers erect, half-open, campanulate; tepals 6, 2.5–4.5 cm long, 1–1.3 cm broad, subacute, blue-lilac or violet, with accumbent hairs on the outside; fruitlets ca. 4 mm long, with long (4–6 cm) slender flexuous awns (styles) covered with dense spreading hairs, tips glabrous. May. (Plate XVIII, Figure 3).

Dry meadows and stony meadow slopes.— Far East: Ze.-Bu., Uss. **Gen. distr.:** Jap.-Ch. (E. and N. China, Manchuria). Described from China. Type in Leningrad.

Series 3. **Hallerianae** Juz.— Plants flowering before appearance of radical leaves; leaves pinnatisect with parted segments, the lateral subsessile; flowers gaping.



PLATE XVIII. 1 - *Pulsatilla kostyczewii* (Korsh.) Juz., habit; 2 - *P. vernalis* (L.) Mill., habit; 3 - *P. chinensis* (Bge.) Rgl., radical leaf; 4 - *P. halleri* (All.) Willd., radical leaf; 5 - *P. grandis* Wenderoth, a) radical leaf, b) compound fruit, c) fruitlet; 6 - *P. patens* (L.) Mill., a) habit, b) radical leaf; 7 - *P. multifida* (Pritzell) Juz., radical leaf; 8 - *P. ajacensis* Rgl. et Tiling, radical leaf.

5. *P. halleri* (All.) Willd., Enum. pl. hort. reg. Berol. (1809) 850. — *Anemone halleri*, All. Fl. Pedem. II (1785) 170; Shmal'g., Fl. I, 8. — Ic.: Allioni, l.c., tab. 80, fig. 2; Rchb., Ic. Fl. germ. IV, tab. LV, fig. 4659. — Exs.: HFR No. 1101 (sub nom. *A. halleri* All.).

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Perennial, 9–25(–30) cm high; rootstock multicapital; stem erect, with a dense villous indumentum of long horizontally spreading hairs; radical leaves appearing after flowering, their petioles with a densely villous indumentum of long erect-spreading or almost spreading hairs, the leaf blade broad-ovate or oblong-ovate, pinnatisect, with one terminal segment and 2 pairs of lateral segments, the latter bifid, tripartite almost to base, the lobes 2–3-incised with oblong-linear acute lobules; lateral segments short-petioluled or subsessile, the terminal segment long-petioluled, all strongly lanate-villous when young but subsequently less strongly pubescent (sometimes remotely pilose above); involucre 2–3 cm long, erect, parted into narrow-linear lobes, with a very dense villous indumentum of long horizontally spreading silky hairs; flowers erect, on the outside with a very dense villous indumentum of long spreading hairs as on peduncles; tepals mostly 6, 2.5–4 cm long, long-ovate, acute, dark violet, campanulately convergent at first but subsequently flat, spreading; fruitlets 5–5.5 mm long, oblong, pilose, their styles 3.5–4 cm long, covered with dense hairs, at apex hairs reduced, accumbent. April–May, fr. June–July. (Plate XVIII, Figure 4).

Open mountain slopes and rocks, dry herb-covered habitats, and forest clearings. — European part: Crim. Gen. distr.: the Alps of W. Europe (France, Switzerland, Italy). Described from Piedmont (Quiras Valley). Type in Turin.

Note. The Crimean plant probably constitutes a separate variety (*P. taurica* Juz. ined.). It differs somewhat from the West European plants by its stronger stem, the longer hairs, which are particularly noticeable on the involucre leaves, and its somewhat larger flowers with broader tepals.

Series 4. *Vulgares* Juz. — Like the preceding series, but the leaf segments pinnatisect with pinnatipartite segments of the second order, the lateral segments with more or less long petiolules.

6. *P. grandis* Wenderoth in Schrift. d. Ges. f. Naturw. Marburg, II (1831) 257. — *A. vulgaris* Beck, Fl. Nieder-Oesterr. I (1890) 409, non Mill. — *Anemone grandis* Kern., Schedae fl. exsicc. Austro-Hung. II (1882) 109. — *A. pulsatilla* Host, Fl. Austr. II (1891) 93 et auct. mult., non L. — *A. pulsatilla* var. *ucrainica* Ugrinsky in Tr. Obshch. isp. prir. Khar'k. Univ. XLIV (1911) 312. — Ic.: Rchb., Ic. fl. Germ. IV, tab. LIV, fig. 4657b. — Exs.: Fl. exs. Austro-Hung. Nos. 611 et 612; Dörfler, Herb. Norm. Nos. 4403 et 4405.

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Perennial, 5–40 cm high; rootstock very strong, vertical, almost black, often multicapital; stem erect, with dense long spreading hairs; radical leaves appearing after flowering, borne on long densely squarrose-pilose petioles, broad-ovate, imparipinnately parted, their lateral segments short-petioluled, irregularly bipinnatipartite and incised, with linear-lanceolate

lobes and lobules 1–4 mm broad and with an almost identical terminal segment borne on a longer petiolule; leaf blade sericeous-pilose when young (particularly beneath) but subsequently glabrous; involucre leaves parted into narrow-linear lobes, covered with dense long spreading silky hairs; peduncles erect, at flowering 1–2 cm long, subsequently greatly elongating, tomentose; flowers campanulate at first, subsequently gaping; tepals 3–5.5 cm long, narrow-ovate, often subacute, dark or pale violet, villous on the outside; stamens numerous, half as long as tepals, dark yellow; receptacle in fruit elongated; fruitlets rather long, pilose, with a pilose mostly reddish violet style 3.5–5 cm long, in upper part covered with almost accumbent hairs, glabrous at the very apex. (Plate XVIII, Figure 5, a–c).

European part: M. Dnp. **Gen. distr.:** Centr. Eur. (Austria, Hungary, S. Bavaria, etc.). Described from Germany? Type in Berlin.

Note. In identifying the USSR plant with *P. grandis* Wender. we have followed Hayek, though thorough research of the Ukrainian forms may make his view untenable.

7. *P. turczaninovii* Kryl. et Serg. in Animadv. syst. ex Herb. Univ. Tomsk. (1930) Nos. 5–6, p. 1; Kryl., Fl. Zap. Sib. V (1930) 1167. — *P. vulgaris* C.A.M. in Ldb., Fl. Alt. II, 369; Ldb., Fl. Ross. I, 21; Turcz., Fl. Baic.-dahur. I, 37; Kryl., Fl. Alt. I, 15, non Mill.

Perennial, 5–35 cm high; rootstock very strong; petioles covered with erect-spreading hairs; radical leaves appearing simultaneously with flowers, ovate in outline, 4–14 cm long, bipinnatisect, with 3 pairs of segments of the first order with more or less long petiolules, segments of the second order parted into long rather narrow (1–2.5 mm broad) linear acute lobes; involucre leaves deeply (sometimes almost to base) palmately parted into pinnatifid segments with entire or apically 2–3-toothed lobules; total number of lobules and teeth in the involucre 20–40; flowers suberect, large, half-open, appressed-pilose on the outside; tepals divaricate, 2.5–3.5 cm long, 8–12 cm broad, flat, blue-violet; stamens one-third to half as long as tepals; fruitlets with awn (styles) 3.5–4 cm long. End of April, May.

Steppe meadows, pine forest margins, and sandy hills covered with pine forest. — W. Siberia: Ob, Alt., Irtysh; E. Siberia: Yenisei, Angara, Dauria; Far East: Zeya-Bureya. **Gen. distr.:** Manchuria, E. Mong., N. Tib. (?). Described from Dauria. Type in Leningrad.

295 Series 5. *Patentes* Juz. — Like the two preceding series, but the leaves palmatisect (however, the middle segment sometimes with a short petiolule).

8. *P. patens* (L.) Mill., The Garden Dict. ed. VIII (1768) No. 4; Ldb., Fl. Ross. (1842) 19 p.p. — *Anemone patens* L., Sp. pl. (1753) 538 ex parte; Hayek in Aschers. Festschr. (1904) 459 et auct. mult. — *Pulsatilla latifolia* Rupr. in Bull. phys.-math. Acad. Pétersb. XII (1854) 218 — *P. patens* subsp. *latifolia* Zamels in A.H.B. Univ. Latv. I (1926) 85. — Ic.: Rchb., Ic. Fl. Germ. IV, tab. LVII, fig. 4661, Zamels,

l. c., p. 86, tab. 1 (folia). — Exs.: Fl. exs. Austro-Hung. No. 2550; Meinsh., herb. Fl. Ingr. cent. IX, No. 9.

Perennial, 7–15(–45) cm high; rootstock strong, vertical, dark brown, multicapital; stems erect, covered with dense soft spreading hairs; radical leaves appearing after flowering and dying off in the fall, with long rather sparsely pilose petioles, rounded-cordate in outline, 3-palmatisect, with rhombic deeply 2–3-partite segments and cuneate 2–4-incised or -toothed lobes with acute, often somewhat curved lobules; leaf blade pilose particularly beneath when young, becoming glabrous; involucre leaves erect, parted into narrow-linear lobes, strongly pilose; peduncles erect; flowers erect, broadly campanulate at first, becoming stellately spreading; tepals 6, 3–4 cm long, narrow-ovate, acuminate, straight, blue-violet, pilose on the outside, many times as long as the very numerous yellow stamens; fruitlets oblong, strongly pilose like the styles, 3–5 cm long. April–May. (Plate XVIII, Figure 6, a–b).

Sparse pine forests and dry sunny slopes. — European part: most regions except L. V., Crim: W. Siberia: Ob, U. Tob., Irt. **Gen. distr.:** Centr. Eur., Scand. (in Sweden: Angermanland at ca. 64°N and on the island of Gotland). Described from Tobol'sk and "Lusatia." Type in London.

Note. This species is here taken in a narrower sense than usual; it would perhaps be more accurate to designate it *P. latifolia* Rupr., as it differs from the plant from Tobol'sk originally cited by Linnaeus. While rather constant in its characters in Europe, the type *P. patens* becomes extremely polymorphic in the Urals and especially in Siberia, where the following features are noticeable; 1) a predominance of forms with strongly dissected leaves, narrow leaf lobes and lobules, and 2) the presence of yellow-flowered forms side by side with violet-flowered forms. An attempt is made below to separate the forms which are clearly of Siberian origin from the typical *P. patens*, and to reduce them to two basic groups of forms. However, it must be emphasized that the isolation of the representatives of these two groups from the European *A. patens* as well as from each other is by no means complete. The numerous intermediate forms that developed under natural conditions sometimes make a strict discrimination between the three types impossible. *A. patens* subsp. *uralensis* Zam. is probably one of these intermediate forms.

Hybrids. *P. patens* (L.) Mill. × *P. vernalis* (L.) Mill. — *P. intermedia* Lasch in Linnaea III (1828) 164. — European part: Lad.-Ilm.

P. patens (L.) Mill. × *P. pratensis* (L.) Mill. — *P. wolfgangiana* (Bess. in Rchb., Iconogr. bot. IV (1826) p. 41 saltem p. p. sub *Anemone*). — *P. hackelii* auct. plur., non Rchb. — Ic.: Rchb., l. c., tab. 351. — European part: Lad.-Ilm., M. Dnp.

9. *P. multifida* (Pritzel) Juz. comb. nova. — *P. patens* var. 3 Ldb., Fl. Alt. II (1830) 368; Fl. Ross. I 19 p. p. — *P. patens* subsp. *multifida* Zamels in A. H. Bot. Univers. Latv. I (1926) 98. — *Anemone patens* var. *multifida* Pritz. in Linnaea XV (1841) 58. — *A. angustifolia* Hayek in Aschers. Festschr. (1904) 459 ex parte, non Turcz. — Ic.: Curtis. Bot. Magazine, tab. 1994; Zamels, l. c., p. 99, tab. 8 (folia). — Exs.: Dorfl., Herb. norm. No. 4402 et Pl. Amur. et Zeaëns. No. 428.

Perennial, distinguished from *P. patens* (L.) Mill., which it resembles in color of tepals and from which it is indistinguishable in the flowering stage, mainly by the strongly dissected leaf blades with a total of 30–80

lobules and teeth, by the much narrower leaf segments, lobes, and lobules, and by the usually distinct petiolule of the middle segment. (Plate XVIII, Figure 7).

Arctic: An.; European part: V.-Kama, Transv.; W. Siberia: Ob, U. Tob., Irt., Alt.; E. Siberia: Yenisei, Dau.; Far East: Kamch., Okh., Uda, Ze.-Bu. Gen. distr.: Mong. Described from Siberia.

Note. Apart from the true *P. multifida* (Pritz.), a series of closely related forms are also provisionally included. More detailed research will probably show these to be distinct varieties, but without exact data and field observations, it is not now possible to distinguish between them. These forms include, for example, *A. patens* subsp. *kryloviana* Korsh. Tent. (1898) 4 (*P. kryloviana* Juz. ined.), *A. patens* subsp. *asiatica* Kryl. et Serg. Fl. Zap. Sib. V (1936) 1166, etc.

10. *P. flavescens* (Zuccar.) Juz. comb. nova. — *Anemone flavescens* Zuccarini in Regensb. Zeit. I (1826) 371; Pritzel in Linnaea XV (1841) 585. — *P. hirsutissima* var. *flavescens* E. Huth in Engl. Bot. Jahrb. XXII (1897) 588. — *P. patens* subsp. *flavescens* Zamels in A. H. B. Univ. Latv. I (1926) 95. — Ic.: Zamels, l.c., p. 96, tab. 6, fig. 8 (folium).

297 Perennial, distinguished from *P. multifida* only by its yellow flowers. European part: V.-Kama; W. Siberia: Ob, Irt.: E. Siberia: Yenisei, Lena-Kol., Dau. Described from Omsk.

Note. The independence of the yellow-flowered forms from *A. patens* is reflected in their distinct area of distribution: entire regions are occupied either by yellow or by violet-flowered forms. Like *P. multifida*, *P. flavescens* is a very polymorphic species, and eventually probably will be divided into a series of local varieties. *P. angustifolia* Turcz. in Bull. Soc. Nat. Mosc. XIII (1840) 61 s. str., described from Yakutsk, seems to represent one variety of this kind. It is smaller and more slender than the typical *P. flavescens* in all its parts, with leaf lobes only ca. 1 mm broad, and small often seminant flowers usually appearing simultaneously with the leaves.

Series 6. *Ajanenses* Juz. — Plants flowering simultaneously with appearance of radical leaves; leaves ternate with deeply parted segments, the middle segment petiolulate; leaf blade short-ovate in outline; involucre leaves with a pubescence of yellowish hairs; flowers gaping.

11. *P. ajanensis* Rgl. et Tiling, Flor. Ajan. in Nouv. Mém. Soc. Nat. Mosc. XI (1859) 28. — *Anemone ajanensis* Hayek in Festschr. z. Feier d. siebzigst. Geburtst. Prof. Dr. Aschers. (1904) 473.

Perennial, 5–12 cm and in fruit to 20 cm high; rootstock vertical; stems ascending, covered with dense spreading yellowish hairs; radical leaves appearing simultaneously with or after flowering, with spreading-pilose petioles, broadly ovate-rhombic or suborbicular in outline, almost imparipinnately dissected, with (2 pairs of) sessile lateral segments and a terminal segment, these pinnatifid with broadly cuneate 2–3-incised lobes and short-lanceolate subacute lobules; involucre leaves with lobes 2–3-parted into narrowly linear-lanceolate acute lobules, covered with

very dense long yellowish hairs; peduncles very short, elongating in fruit, densely pilose; flowers erect or declinate, half-open, campanulate; tepals 2.5–3 cm long, ca. 1.5 cm broad, obtuse, apex flat; stamens numerous, the glands on short stalks; style of fruitlets 3 cm long, plumose, with hairs from above middle of style, becoming accumbent above, glabrous at apex. May. (Plate XVIII, Figure 8).

Mountain meadows and other open habitats. — Far East: Okh., Uda. Endemic. Described from Ayan. Type in Leningrad.

Note. In the Botchi River valley, in the northern Sikhote-Alin Range, I. Shishkin collected a plant which V. L. Komarov refers to the closely related *P. nivalis* Nakai. However, Shishkin's specimens consist only of sterile rosettes of radical leaves, and therefore, we have not included that species in the Flora of the USSR.

298 Series 7. *Bungeanae* Juz. — Plants flowering simultaneously with appearance of radical leaves; leaves pinnatisect, the leaf blade oblong in outline; involucrel leaves covered with white hairs; flowers gaping.

12. *P. bungeana* C. A. M. in Ldb., Fl. Alt. II (1830) 371; Ldb., Fl. Ross. I, 22; Kryl., Fl. Alt. I, 16; Kryl., Fl. Zap. Sib. V, 1169. — *Anemone bungeana* Pritzel in Linnaea XV (1841) 603; Hayek, l. c., p. 473. — Ic.: Ldb., Ic. pl. Fl. Ross. tab. 110.

Perennial, 1.5–5 cm, in fruit to 8 cm high; rootstock vertical, stout, multicapital; radical leaves appearing before flowering; stem and petioles covered with appressed sericeous hairs, the leaves oblong in outline, pinnatisect, their frequently very distant segments also pinnatisect, with short and rather broad entire or dentate subobtusely segments of the second order, slightly pilose; involucrel leaves with lobes 3-incised at the apex, with rather short entire or incised lobules; flowers smallish, mostly erect, half-open, broadly campanulate; tepals 12–15 mm long, 3–7 mm broad, bluish violet; stamens numerous, two-thirds or half the length of the tepals; glands on long (ca. 5 mm) filiform stalks; fruitlets 4 mm long, with short rigid awns 1.5 cm long. Fl. June. (Plate XIX, Figure 1, a–b).

Rock fissures, rock ledges, and stony steppe slopes. — W. Siberia: Alt. (SE). Gen. distr.: Mong. Described from Altai (Chuya River). Type and cotype in Leningrad.

13. *P. tenuiloba* (Hayek) Juz. comb. nova. — *Anemone tenuiloba* Hayek in Festschr. Z. Feier. d. siebzigst. Geburst. Prof. Dr. P. Aschers. (1904) 472. — *P. vulgaris* var. *tenuiloba* Turcz., Fl. baic.-dahur. I (1842) 37.

301 Perennial, 8–16 cm high; rootstock vertical; radical leaves appearing before flowering; stem and petioles covered with dense accumbent sericeous hairs, the leaves oblong in outline, pinnatisect, their segments distant, ovate or oblong-ovate in outline, pinnately dissected into rather short narrow-linear entire or cuneate parted subacute or acute subdivisions, remotely pilose; involucrel leaves with apically 3-incised lateral lobes and a tripartite middle lobe, the lobules of the latter 3-incised, like lateral lobes with linear entire or incised subdivisions, the leaf blade densely sericeous-pilose; peduncles erect; flowers smallish or of medium size, half-open,

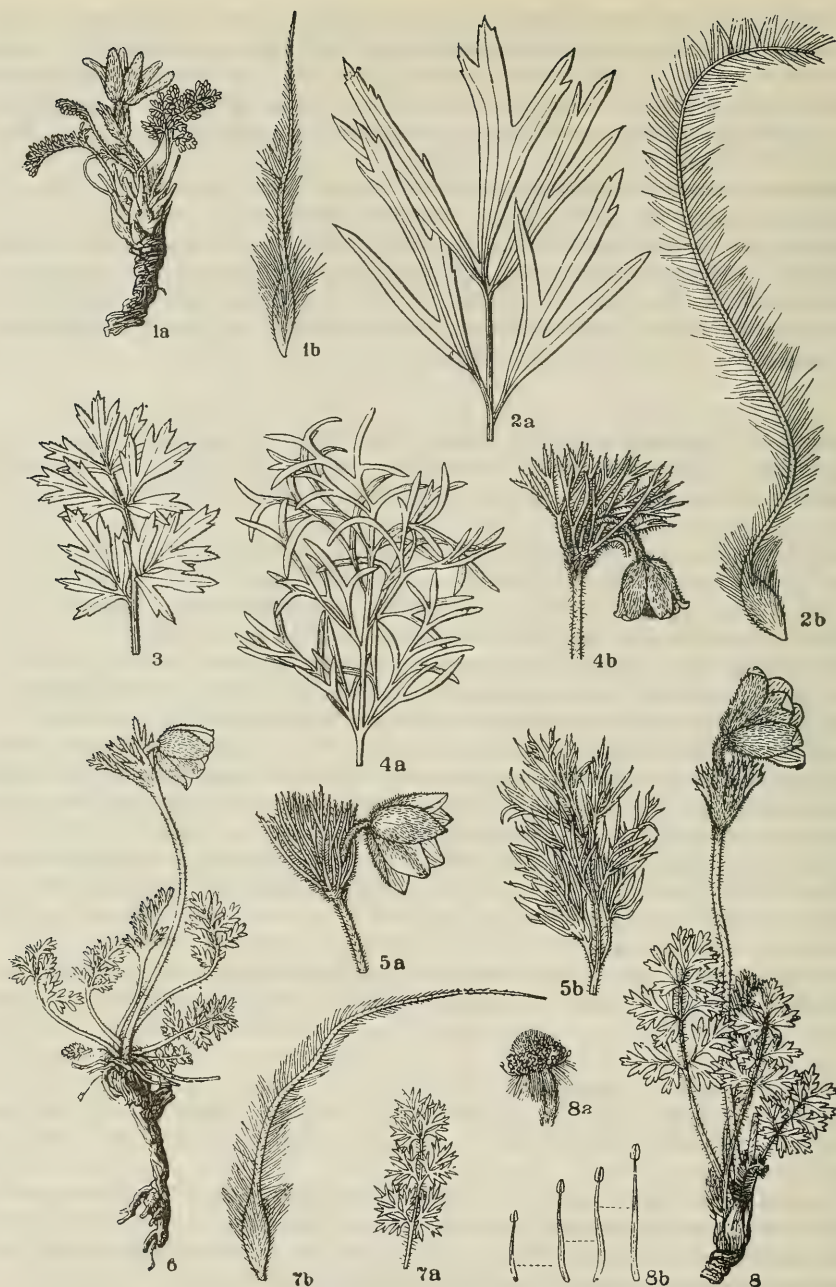


PLATE XIX. 1 - *Pulsatilla bungeana* C.A.M., a) habit, b) fruitlet; 2 - *P. dahurica* (Fisch.) Spreng., a) radical leaf, b) fruitlet; 3 - *P. cernua* (Thunb.) Bercht. et Opiz., radical leaf; 4 - *P. pratensis* (L.) Mill., a) radical leaf, b) upper part of stem; 5 - *P. montana* (Hoppe) Rchb., a) upper part of stem, b) radical leaf; 6 - *P. campanella* Fisch., habit; 7 - *P. violacea* Rupr., a) radical leaf, b) fruitlet; 8 - *P. ambigua* (Turcz.) Juz., habit, a) fruiting receptacle, b) stamen.

campanulate; tepals 2–3 cm long, 0.6–1 cm broad, violet; stamens numerous, one-third to half the length of the tepals; glands on stalks; fruitlets ca. 5 mm long, with short rather stout usually curved awns ca. 2 cm long. June.

Rocks and stony slopes. — E. Siberia: Dau. Gen. distr.: Mong. Described from the Ingoda River. Type and cotype in Leningrad.

14. *P. sukaczewii* Juz., sp. nova in Addenda VI, p. 570.

Perennial; stem 3–16 cm high; petioles with remote spreading hairs; leaves with scattered or sparse long spreading hairs; involucre leaves with rather dense spreading hairs; flowers gaping; tepals 14–20 mm long, 6–12 mm broad, pale yellow, with a slight violet tinge confined to the outside and in other characters resembling *P. tenuiloba* (Hayek) Juz. June.

Stony slopes. — E. Siberia: Ang.-Say. Endemic. Described from the western shore of Lake Baikal, from the northern slopes of Mt. Krestovka. Type and cotype in Leningrad.

Series 8. *Pratenses* Juz. — Plants flowering simultaneously with appearance of radical leaves; leaves pinnatisect into bipinnatifid segments; flowers campanulate; achenes with long awns (3.5–6 cm).

15. *P. pratensis* (L.) Mill., The Garden Dict. ed. VIII (1768) No. 2. — *P. reflexa* Gilib., Fl. Lith. II (1789) 278. — *P. breynii* Rupr. in Bull. Ac. Pétersb. vol. XII (1854) 28. — *Anemone pratensis* L., Sp. pl. (1753) 539; Ldb., Fl. Ross. I, 21 p.p. — Ic.: Sturm, Deutschl. Fl. H. 90; Rchb., Ic. fl. Germ. IV, tab. LIII, f. 4655. — Exs.: Dörf., Herb. norm. No. 4407; Rehm. et Wol., Fl. Pol. No. 103a et b.

302 Perennial; stem 7–30(–45) cm high; rootstock stout, mostly vertical, dark brown, capitate or multicapitate; radical leaves appearing simultaneously with or after flowering, not overwintering, their petioles with a villous indumentum of dense white hairs, the leaf blade broad-ovate in outline, pinnatisect into bipinnatifid segments, with narrow-linear acuminate lobes 1–3 mm broad, villous (mainly beneath); stem erect, densely short-pilose; involucre leaves parted into linear pilose lobes; peduncles curved, in fruit greatly elongating, erect; flowers usually nutant, tepals 6, campanulately convergent, apically recurved, 1.5–2.5 cm long, 0.6–1 cm broad, mostly pale lilac, more rarely reddish or greenish yellow; stamens numerous, yellow, two-thirds the length of the tepals; pistils as long as perianth; fruitlets oblong, with ovary and style covered with dense spreading hair, the latter elongating into an awn, 6 cm long, the hairs usually becoming short and acuminate at its tip. April–June (occasionally flowering a second time in the fall). (Plate XIX, Figure 4, a–b).

Pine forests, forest margins, open sandy hills, and dry slopes. — European part: Lad.-Ilm., U. V., U. Dnp., M. Dnp.? Gen. distr.: Centr. Eur. (NE Germany, Poland, Galicia), Fennoscandia (S.). Described from Sweden and Germany. Type in London.

16. *P. nigricans* Störck, Lib. de Usu med. *P. nigricantis* (1771) 7. — *Anemone pratensis* Roth, Tent. Fl. Germ. II, 1 (1789) 609 et auct. mult., non L. s. str. — *Pulsatilla pratensis* Rchb., Fl. Germ. exs.

(1832) 738, non Mill. — *Anemone nigricans* Kern., Sched. Fl. exs. Austro-Hung. VII (1897) 47. — Ic.: Rchb., Ic. Fl. Germ. IV, tab. LIII, f. 4656. — Exs.: Kerner, Fl. exs. Austro-Hung., No. 2551.

Perennial; lobes of radical leaves very narrowly linear, 1–2 mm broad; tepals black-violet, densely sericeous-pilose on the outside; stamens considerably shorter than tepals. In other characters resembling the preceding species. May–June.

Habitat as for the preceding species. — European part: reported from M. Dnp. **Gen. distr.:** Centr. Eur. Described from Germany.

Note. This species differs but slightly from *P. pratensis* (L.) Mill.; its presence in the USSR requires confirmation (Ukrainian forms of the type *P. pratensis* require field observations concerning variability of flower color).

17. *P. montana* (Hoppe) Rchb., Fl. Germ. excurs. (1832) 733. — *Anemone montana* Hoppe in Sturm, Deutschl. Flora H. 46 (1826) tab. 4. — *Pulsatilla intermedia* Hoppe et Hornsch., Tageb. Reise Küst. Adriat. Meeres (1818) 178 nomen nud. — Ic.: Sturm, l. c.; Rchb., Ic. Fl. Germ. IV, tab. LIII, f. 4656. — Exs.: Fl. exs. Austro-Hung. No. 2552; Dörf., Herb. norm. No. 4409.

303 Perennial; stem 7–20 cm, in fruit to 32 cm high; rootstock strong, vertical, blackish; radical leaves appearing simultaneously with or after flowering, dying off in the fall, with long villous petioles, pinnatisect into bipinnatifid segments with narrow-linear acute lobes; stems erect, densely soft-pilose; involucral leaves parted into narrow-linear slender acuminate very densely pilose lobes; peduncles slightly curved or almost straight; flowers campanulate, nutant or slightly declinate; tepals dark violet, extremely villous on the outside, erect at first, subsequently mostly diverging stellately, apex flat, rarely slightly curved outward; stamens numerous, yellow, half the length of the tepals; styles shorter than tepals by at least one third; fruitlets with rather stout flexuous awns to 4 cm long, covered with spreading hairs becoming erect in upper part. May. (Plate XIX, Figure 5, a–b).

Dry open hills and shrub-covered slopes. — European part: Bl., M. Dnp., V.-Don. **Gen. distr.:** Centr. Eur. Described from forests ("von Lippiza") and from the vicinity of Trieste. Type in Vienna.

Note. In our treatment of forms growing in the Volga-Don region, we follow Hayek, but we doubt whether these forms belong to *P. montana*. In any case, they require critical investigation on the basis of more abundant material.

Series 9. **Cernuae** Juz. — As the preceding series, but the radical leaves pinnatisect, with deeply parted segments.

18. *P. dahurica* (Fisch.) Spreng., Syst. Veget. ed. 16, II (1825) 663; Turcz., Fl. baic.-dah. I, 36; Ldb., Fl. Ross. I, 20; Kom., Fl. Mansh. II 273. — *Anemone dahurica* Fisch. ex DC., Prodr. I (1824) 17. — Exs.: Magnier, Fl. sel. No. 2621.

Perennial, 15–40 cm high; rootstock oblique, producing 1–5 stems; radical leaves appearing before flowering, rather sparsely and rather shortly pilose petiolate, oblong-ovate in outline, pinnatisect into 2 pairs of more or

less distant narrow-rhombic sessile or very short petioluled segments, with a broader petiolulate terminal segment, all segments deeply and irregularly 2-3-partite, their cuneate lobes apically 2-3-incised with linear-lanceolate acute, usually subobtusely entire or acutely serrate-dentate lobules; leaf blade usually with only isolated or scattered hairs above, more or less pilose beneath; stems erect, rather sparsely tomentose; involucreal leaves with large oblong-linear lobes 2-3-fid or -toothed at apex; pedicels short, somewhat curved or declinate, more rarely suberect, rather sparsely tomentose, greatly elongating in fruit; flowers of medium size, gaping; tepals 6, 2.3-3 cm long, 0.9-1.2 cm broad, erect, not apically curved, pale blue-violet; fruitlets ca. 5 mm long, with a long (ca. 5 cm) slender flexuous awn covered to its apex with soft spreading hairs. June-July. (Plate XIX, Figure 2, a-b).

River pebbles (open or shrub-covered).— E. Siberia: Dau.; Far East: Ze.-Bu., Uss. Gen. distr.: Jap.-Ch. Described from the Ingoda River in Dauria (type in Geneva).

19. *P. cernua* (Thunb.) Bercht. et Opiz, Rostl. I Ranuncul. (1820) 22; Spreng. Syst. nat. ed. 16, II (1825) 664; Kom., Fl. Mansh. II, 1 (1903) 272.— *Anemone cernua* Thunb., Fl. Jap. (1784) 238.— Ic.: Siebold, Fl. Jap. (1835), tab. 4; Kom. et Klob., Al. Key Pl. Far East. Reg. URSS 1, tab. 166.

Perennial; stem 4-20 cm high; rootstock long, strong, subvertical, frequently multicapital; radical leaves with densely tomentose stem and petioles, leaves smaller than in *P. dahurica*, pinnatisect, with 1 terminal and 2 pairs of lateral segments, all segments broad-rhombic, the lateral sessile, the terminal long-petioluled, deeply 2-3-partite, with cuneate lobes apically 2-3-incised or -toothed and with acute rather short ovate-lanceolate lobules; leaf blade with isolated hairs above and dense accumbent hairs beneath; stems erect; involucreal leaves with linear, rather narrowly linear, entire mostly apically 2-3-fid lobes; peduncles densely tomentose, mostly somewhat curved or nutant; flowers of medium size, not opening, rarely half-open; tepals 2.2-3.5 cm long, 0.6-1.2 cm broad, erect, bright violet-red or dark purple-brownish, with a dense gray villous indumentum on the outside, apex not curved; fruitlets with awns considerably shorter than in *P. dahurica*, glabrous at the very apex. May-July. (Plate XIX, Figure 3).

Dry open slopes, more rarely turfy river sands.— Far East: Ze.-Bu., Uss. Gen. distr.: Japan, N. Mongolia, Manchuria, Korea. Described from Hokkaido Island (Japan).

Hybrids: \times *P. kissii* Mandl. in Ö. B. Z. LXXI Jahrg. (1922) 178.— (*P. koreana* Nakai in Mori, Enum. Pl. Cor. (1922) 159 sec. Komarov).— *P. cernua* Spreng. \times *P. chinensis* (Bge.) Rgl.— Leaves trisected, their segments deeply incised and broad-rhombic; flowers 3-3.7 cm long, purple-violet. Uss. (Nikol'sk-Ussuriisk [Ussuriisk]).

Series 10. *Campanellae* Juz.— Like series *Pratenses* Juz., but usually smaller; fruitlets with short awns (2-3.5 cm).

20. *P. albana* (Stev.) Bercht. et Presl, Rostl. I Ranuncul. (1820) 22.— *P. albana* α *floribus flavis* Ldb., Fl. Ross. I (1842) 22.— *P. albana*

var. *flavescens* Rgl. in Bull. Mosc. XXXIV (1861) 29. — *Anemone albana* Stev. in Mém. Soc. Nat. Mosc. III (1812); M. B., Fl. taur.-cauc. III, 376; Boiss., Fl. Or. I, 10. — *A. albana* subsp. *flavescens* N. Busch in Fl. Cauc. crit. III, 3 (1902) 100.

305 Perennial, 5–18 cm, in fruit to 30 cm high; radical leaves appearing almost simultaneously with flowers, the leaf blade 2.5–6 cm long, oblong in outline, bipinnatisect with 3–4 pairs of segments of the first order, segments of the second order deeply pinnately parted into small lanceolate, mostly linear subobtusely entire or slightly incised-dentate lobes, villous particularly when young mainly beneath; involucral leaves 1.5–3 cm long with linear-subacute entire or slightly incised lobes; flowers declinate or mostly nutant, campanulate, with a narrowed base; tepals 18–25 mm long, oblong-elliptic with reflexed tips, yellow, with dense appressed sericeous hairs on the outside; stamens two-thirds to three-fourths the length of the tepals; fruitlets with short stout awns 2–2.5 cm long, with accumbent hairs near apex, glabrous at the very apex. May–July.

Meadows and rocks (mainly limestone but also primary rocks) in the alpine zone, more rarely in the subalpine and forest zones. — Caucasus: Cisc., E. Transc., Dag. (Main Range); also reported for Talysh. Gen. distr.: Iran? Described from Mt. Shakh-dag. Type in Helsinki.

21. *P. andina* (Rupr.) Woron. in Sched. ad Herb. Fl. Cauc. VIII (1916) 74. — *P. albana* var. *andina* Rupr., Fl. Cauc. (1869) 6. — *A. albana* subsp. *andina* Smirn., Enum. (1887) 935; N. Busch in Fl. Cauc. Crit. III, 3 (1902) 103.

Perennial, closely related to *P. albana* (Stev.) but the leaf lobes and lobules narrower and subacute, in particular the flowers 1.5 times larger, suberect (declinate only after flowering), the tepals yellow at first, becoming blood-red after flowering. June–July.

On calcareous rocks in the alpine and forest zones of mountains. — Caucasus: Dag. Endemic. Described from Iol-tau above Gimri and also from Khanaka-tau in the Salatau Range. Type and paratype in Leningrad.

22. *P. violacea* Rupr., Fl. Cauc. (1869) 6. — *Anemone albana* var. *violacea* Boiss., Fl. Or. suppl. (1888) 2. — *A. albana* subsp. *violacea* N. Busch in Fl. Cauc. crit. III, 3 (1902) 103. — Exs.: Herb. Fl. Cauc. No. 356.

Perennial; leaf lobes rather narrow, acute; flowers violet or lilac or very rarely whitish, nutant or suberect; tepals 2.3–2.8 mm long, curved at the apex. Other characters as in *P. albana*. End of May, June. (Plate XIX, Figure 7, a–b).

Alpine and subalpine zones. — Caucasus: Cisc., Dag., E. and S. Transc. (Main Range and Lesser Caucasus). Endemic? Described from the village of Kazbek in the Main Range. Type in Leningrad.

23. *P. georgica* Rupr., Fl. Cauc. (1869) 9. — *Anemone albana* var. *georgica* Smirn. Enum. (1887) 936; N. Busch in Fl. Cauc. crit. III, 3 (1902) 104 pro subsp.

Perennial, closely related to *P. violacea* but distinguished from it by its very narrow almost setiform lobes and lobules, and by its flowers which are somewhat paler pinkish lilac, pale lilac or almost colorless on the inside. March–May.

Forest zone of mountains. — Caucasus: E. Transc., mainly in the vicinity of Tbilisi and south of the city. Endemic. Described from the vicinity of Tbilisi (Kodzory, St. George's Church). Type in Leningrad.

Note. This critical species is probably merely a more xerophytic form of the preceding species growing at lower levels in the mountains.

24. *P. armena* (Boiss.) Rupr., Fl. Cauc. (1869) 9. — *P. albana* var. *armena* Trautv. in A.H.P. IV, 1 (1876) 100. — *Anemone armena* Boiss., Fl. Or. I (1867) 11. — *A. albana* var. *armena* Smirn., Enum. (1887) 936. — *A. albana* subsp. *armena* N. Busch in Fl. Cauc. crit. III, 3 (1902) 105.

Perennial, 5–10 cm, in fruit ca. 20 cm high; stem and petioles of radical leaves covered with dense white erect-spreading or accumbent hairs; radical leaves appearing almost simultaneously with flowers, the blade 1.5–4 cm long, ovate in outline, densely covered with white hairs, bipinnatisect, segments of the second order pinnately divided to base, with approximate shortish narrow linear-oblong subobtusate or acute lobes; involucre leaves, 2–2.5 cm long, parted to the middle or somewhat deeper, with lobes frequently incised, densely spreading-villous; flowers relatively large, declinate or suberect, campanulate; tepals 2–3.5 cm long, oblong, acute, apex flat and straight, purple-lilac, on the outside densely villous with accumbent or somewhat distant rather long white hairs; stamens two-thirds the length of the tepals; fruitlets ca. 2.5 cm long awns resembling those of *P. albana* and *P. violacea*, but somewhat more slender and with a somewhat longer pubescence.

Alpine meadows. — Caucasus: S. Transc. Gen. distr.: Turkish Armenia, Cappadocia. Described from the 7,000-foot high Mt. Maimanzur in Turkish Armenia by Huet and from other places. Type in Geneva; cotype in Leningrad.

25. *P. campanella* Fisch. ex Rgl. et Til., Fl. Ajan. (1859) 30; Kryl., Fl. Zap. Sib. V (1931) 1168. — *Anemone campanella* Fisch. ex Ldb., Fl. Ross. I (1842) 22; Hayek in Festschr. z. Feier, d. siebzigst. Geburst. P. Aschers. (1904) 467. — *P. albana* β flore coerulesc. C.A.M. in Ldb., Fl. Alt. II (1830) 370; Ldb., Fl. Ross. I, 22. — *P. albana* γ parviflora δ campabella Rgl. et Til., l.c. (1858). — *P. albana* auct. mult. fl. Sib. saltem p. p., non Stev. — Ic.: Ldb., lc. pl. Fl. Ross. II, tab. 109.

Perennial, 4–25 cm, in fruit to 25–30 cm high; radical leaves appearing simultaneously with flowers, the blade 2–7 cm long, oblong-ovate in outline, bipinnatisect with 2–3 pairs of segments deeply dissected into abbreviated obtuse or subacute incised-dentate subdivisions to 2 mm broad; involucral leaves 1.5–3 cm long with linear acuminate entire or incised-dentate lobes; flowers more or less declinate, campanulate; tepals 20–27 mm long, 3–13 mm broad, with reflexed tips, violet-blue; stamens just slightly shorter than tepals; glands subsessile; fruitlets with awns ca. 2.5 cm long. May–June. (Plate XIX, Figure 6).

Rocks, stony slopes, ancient moraines, and gravelly lichen-covered mountain tundras. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. Gen. distr.: N. Mong. Described from Altai. Type in the Zeyher Herbarium; cotype in Leningrad.

26. *P. ambigua* (Turcz.) Juz. comb. nova. — *P. regeliana* Kryl. et Serg. in Animadv. system. ex Herb. Univ. Tomsk. (1930) Nos. 5–6, p. 2; Kryl., Fl. Zap. Sib. V (1931) 1167. — *Anemone ambigua* Turcz., Fl. baic.-dah. I (1842) 39, pro synonym. *P. albanæ* δ ; Hayek in Festschr. z. Feier, d. siebzigst. Geburtstages P. Aschers. (1904) 766. — *P. regeliana* Maxim., Enum. pl. Mong. fasc. I (1889) 11. — *P. albanæ* β floribus coeruleis Ldb., Fl. Ross. I (1842) 22, p.p. — *P. montana* β sibirica Rgl., Pl. Radd. (1861) 27 in adnot. — Ic.: Maxim., l.c., tab. III.

Perennial, 5–15 cm, in fruit to 30 cm high; rootstock vertical; radical leaves appearing simultaneously with flowers, with petioles covered by slender spreading hairs, ovate in outline, imparipinnately dissected, the 3 pairs of sessile lateral segments (the lowermost rarely with short petiolules) pinnately parted into ovate or rhombic lobes, cleft into lanceolate or broad-linear lobules 2–4 mm broad; stem erect, pubescence as on the petioles; involucral leaves with linear subacuminate lobes entire or pinnatifid, with oblong-linear entire or apically dentate lobules; flowers nutant at first, subsequently suberect, at first divaricate, later campanulately diverging; tepals 1.8–3 cm long, 0.8–1 cm broad, subobtusely, slightly curved at the apex, blue-violet, rarely pink, with long soft hairs on the outside; stamens one-third or half as long as tepals; fruitlets with flexuous finely plumose awns 2.5–3.5 cm long. May–June. (Plate XIX, Figure 8, a–b).

Sands and mountain slopes. — W. Siberia: Alt., Ang.-Say., Dau. Gen. distr.: Mong., Chinese Turkestan. Described from the village of Vvedenskaya on the Irkut River. Type in Leningrad.

Genus 529. **ATRAGENE** * L. **

Sepals 4–8, petaloid, white, straw-colored, blue-purple, blue, or violet. Petals as long as or shorter than sepals, usually of the same color, acuminate or spatulately broadened at the apex. Stamens numerous with dilated filaments. Fruitlets numerous, cuneate, downy, with a long plumose-pubescent style. Shrubs with long climbing stems. Russian name: knyazhik.

Economic importance. Sometimes cultivated as an ornamental plant.

1. Petals large acuminate, almost or as long as the sepals and similar to them in shape 2. *A. macropetala* Ldb.
- + Petals considerably shorter than sepals, spatulately broadened at the apex 2.
2. Sepals dark blue or azure blue 3. *A. ochotensis* Pall.
- + Sepals white or yellowish white 1. *A. sibirica* L.

1. *A. sibirica* L.; Sp. pl. I (1753) 543; Kryl., Fl. Zap. Sib. V 1172. — *A. alpina* Pall., Fl. Ross. 2 (1784) 69; Ldb., Fl. Alt. II, 376; Ldb., Fl. Ross. I, 4. — *Clematis sibirica* Mill., Dict. ed. VIII (1768) No. 12; D.C., Prodr. I, 10. — *C. alpina* subsp. *sibirica* O. Ktze., Monogr. Clemat. (1885) 162. — Ic.: Pall., l.c., tab. 76.

* The Greek name used by Theophrastus for one of the species of *Clematis*.

** Treatment by I. M. Krashenninikov.

Shrub; stems prostrate or climbing; leaves with long petioles functioning as tendrils, usually biternate; leaf lobes ovate-lanceolate or lanceolate, more or less long-acuminate, serrate, paler-colored beneath, pubescent (like the petioles) along the veins; flowers solitary on more or less long petioles; sepals ovate-lanceolate or lanceolate or linear-lanceolate, 3-5 cm long, with minute hairs on the outside and along the margins, yellowish-white or almost white; petals flat, linear, with a soft pubescence, the outer ones spatulately broadened at the apex, one-third to half the length of the sepals, and as long as the stamens, filaments linear, strongly pubescent with long hairs; fruitlets broadly cuneate, more or less strongly compressed, slightly downy with long plumose-pubescent styles. June-July.

Coniferous and broadleaf forests, forest margins, waterside thickets, forest meadows, mountainous regions on stony slopes and rock outcrops, and above the timberline. — European part: Kar.-Lap., Lad.-Ilm., Dv.-Pech., V.-Kama; W. Siberia: Ob, U. Tob., Irt. (E.), Alt.; E. Siberia: Yenisei. (as far north as 70°N.), Ang.-Say., Dau., Lena-Kol.; Centr. Asia: T. Sh., Pam.-Al. (E.). **Gen. distr.:** Mong. Described from Siberia. Type in London.

2. *A. macropetala* Ldb., Fl. Alt. II (1830) 376; Fl. Ross. I, 4-5. — *Clematis alpina* ssp. *macropetala* O. Ktze., Monogr. Clemat. (1885) 963. — Ic.: Ldb., Icon. pl. nov. (1829) tab. 11 genus im. *Clematis*; Gartfl. (1870) tab. 651.

309 Shrub; stems climbing, woody below, slightly costate, more or less pubescent at the nodes; leaves with long petioles functioning as tendrils, more or less pubescent, biternate or bipinnatisect, the terminal lobe usually tripartite, the lobules ovate or oblong, emarginate or irregularly serrate-margined, lustrous beneath; peduncles long, solitary; flowers nutant; sepals 4, oblong or lanceolate-acuminate, 4-5 cm long, with soft hairs on both surfaces, horizontally gaping, blue-purple, before flowering black-violet; petals numerous, oblong or oblong-linear, acuminate, densely soft-pubescent, the outer ones about as long as the sepals, the inner shorter and paler; stamens numerous, the outer ones tortuous at base and broadened at apex, pubescent; anthers linear; fruitlets narrowly cuneate, more or less pubescent with plumose-pubescent styles. May-June. (Plate XX, Figure 7).

Rocks and open and shaded stony slopes in coniferous and broadleaf forests. E. Siberia: Dau. (E.); Far East: Ze.-Bu. **Gen. distr.:** Jap.-Ch., Mong. (E.). Described from Nerchinsk. Type in Leningrad.

Note. Species of *Atragene* are sometimes cultivated as ornamental plants; *A. macropetala* Ldb. produces outstandingly beautiful flowers.

3. *A. ochotensis* Pall., Fl. Ross. I (1784) 69; Ldb., Fl. Ross. I, 5. — *A. platysepala* Trautv. et Mey., Fl. ochot. (1856) 5. — *A. alpina* var. *ochotensis* Rgl. et Til., Fl. Ajan. (1859) 20. — *A. alpina* var. *platysepala* Maxim., Prim. Fl. amur. (1859) 12. — *A. ochotensis* ssp. *coerulenscens* Kom. in Not. Syst. H. Bot. Petropol. II, 33 (1921) 132. — *Clematis ochotensis* Poir., Encycl. Meth. Suppl. II (1812) 298. — *C. ochotensis* ssp. *coerulescens* Kom., Fl. Kamch. II (1929) 151. — *C. alpina* ssp. *ochotensis* O. Ktze., Mon. Clemat. (1885) 163. — *C. subtriterata* Nakai, Bot. Mag., Tokyo 33 (1919) 49. — Ic.: Kom., Fl. pen. Kamtsch. II, tab. XV.

Shrub; stems decumbent or climbing; leaves with long petioles functioning as tendrils, 1-3-ternate, their oblong-lanceolate acuminate irregularly serrate lobes covered with sparse hairs; sepals 4-6, violet-blue or violet or azure, broad-elliptic to lanceolate in outline, 3-4 cm long, covered with soft hairs; petals linear, more or less strongly spatulately broadened at apex, usually half the length of the sepals, about as long as the stamens, with a long soft pubescence; filaments linear, uniformly pubescent; fruitlets broadly cuneate, compressed, pubescent with long plumose-pubescent styles. June.

Coniferous and broadleaf forests, forest margins, and stony slopes. - E. Siberia: Dau., Lena-Kol.; Far East: Ze.-Bu., Uss., Okh., Uda, Kamch., Sakhal. **Gen. distr.:** Jap.-Ch. Described from the Okhotsk area. Type in the British Museum; paratype in Leningrad.

310 Genus 530. **CLEMATIS** * L.**

Sepals 4-8, petaloid, variously colored; petals absent, stamens numerous, often with dilated filaments; achenes numerous; ovary ovule pendulous; styles more or less elongated, usually plumose-pubescent; leaves opposite. Herbaceous annuals or shrubs, usually with climbing, more or less long, rarely erect stems, and with entire, pseudopinnate or ternately dissected leaves. Russian name: lomonos.

Economic importance. Most species are cultivated in gardens as ornamentals; various hybrids are described in horticultural literature, but it is not known how these were obtained.

1. All leaves pinnatisect (bracts excepted) 5.
- + All leaves entire or the lower entire and the upper pinnatisect 2.
2. All leaves entire 4.
- + Lower leaves entire, the middle and upper pinnatisect 3.
3. Sepals elliptic-lanceolate; lobes of upper pinnate leaves sessile or with a short (1-4 mm) petiolule, small (5-10 mm long) 6. *C. asplenifolia* Schrenk.
- + Sepals oblong; lobes of upper pinnate leaves larger (1-4 cm long), lance-linear, with long (1-2 cm) petiolules 7. *C. ispanica* Boiss.
4. Flowers solitary (rarely 2-3), large, violet or black-purple; sepals to 4-6 cm long 1. *C. integrifolia* L.
- + Flowers numerous, small, in a compound paniculate inflorescence, white or yellow; sepals 1-2 cm long 5. *C. songarica* Bge.
5. Flowers dark brown or violet or red, large 6.
- + Flowers white or yellowish, sometimes with a reddish tinge, small 7.
6. Style short, glabrous in upper part; sepals obovate with a broad pilose margin 4. *C. viticella* L.

* From the Greek *clema*, *clematis*, a tendril; the name used by Dioscorides for several twining and clinging plants.

** Treatment by I.M. Krashennnikov.

- 311 + Style long, plumose-pubescent with grayish brown hairs; sepals oblong-ovate 2. *C. fusca* Turcz.
7. Stems erect 8.
- + Stems climbing or decumbent 11.
8. Leaves thick, rigid, lustrous, with very prominent veins and with long (4-6 cm) narrow linear-lanceolate lobes; sepals densely villous on the outside 8. *C. hexapetala* Pall.
- + Characters different from the above 9.
9. Flowers narrowly campanulate, small (to 1.5 cm long); leaf lobes small, rhombic (rarely linear) 3. *C. aethusifolia* Turcz.
- + Flowers more or less widely gaping 10.
10. Stem 30-70 cm high; leaves almost always bipinnate with small (3-5 cm long) lobes 12. *C. pseudoflammula* Schmalh.
- + Stem 1-1.5 m high; leaves pinnate with large (to 9 cm long) lobes 8. *C. recta* L.
11. Sepals obtuse, orbicular 12.
- + Sepals more or less strongly acuminate 14.
12. Leaves bipinnatisect with small lobes 11. *C. flammula* L.
- + Leaves pinnate with large lobes 13.
13. Sepals densely pubescent on both surfaces 13. *C. vitalba* L.
- + Sepals downy only on the outside at the margins 10. *C. manshurica* Rupr.
14. Leaves light or dark green, thin. Plants of the forest zone 15.
- + Leaves gray-green, thick, somewhat fleshy. Plants of the desert and semidesert zones 17. *C. orientalis* L.
15. Flowers narrowly campanulate; leaves 2-3-pinnatisect with small rhombic (rarely linear) lobes 3. *C. aethusifolia* Turcz.
- + Flowers more or less widely gaping; leaves 1-2-pinnatisect or biternate with ovate or ovate-lanceolate or elliptic lobes. 16.
16. Filaments broad-linear, narrowed only at apex, more or less densely pubescent 17.
- + Filaments narrow-linear, glabrous 14. *C. brevicaudata* DC.
17. Pedicels stout, long, terminal or in leaf axils; flowers solitary. Shrubs with strong profusely branched decumbent stems 18. *C. tangutica* (Maxim.) Korsh.
- + Pedicels slender, short; flowers solitary or several together in leaf axils. Shrubs with slender decumbent or climbing stems 18.
- 312 18. Leaf lobes entire, trifid or tripartite at the apex 15. *C. glauca* Willd.
- + Leaf lobes tripartite and, in addition, irregularly serrate-dentate 16. *C. serratifolia* Rehder.

Section 1. VIORNA Prantl in Engl. Pflanzenfam. III, 2 (1891) 63.— Flowers cup-shaped, mostly solitary, sepals and stamens erect or ascending; anthers narrow, linear.

1. *C. integrifolia* L., Sp. pl. (1753) 544; Ldb., Fl. Ross. I, 2; Boiss., Fl. Or. I, 2; N. Busch in Fl. cauc. crit. III, 107.— *C. integrifolia* var. *normalis* O. Ktze., Monogr. Clemat. (1885) 176.— Ic.: Jacq., Fl. austr., tab. 363; Rchb., Ic. Fl. Germ., IV, f. 4663.— Exs.: HFR No. 1001.

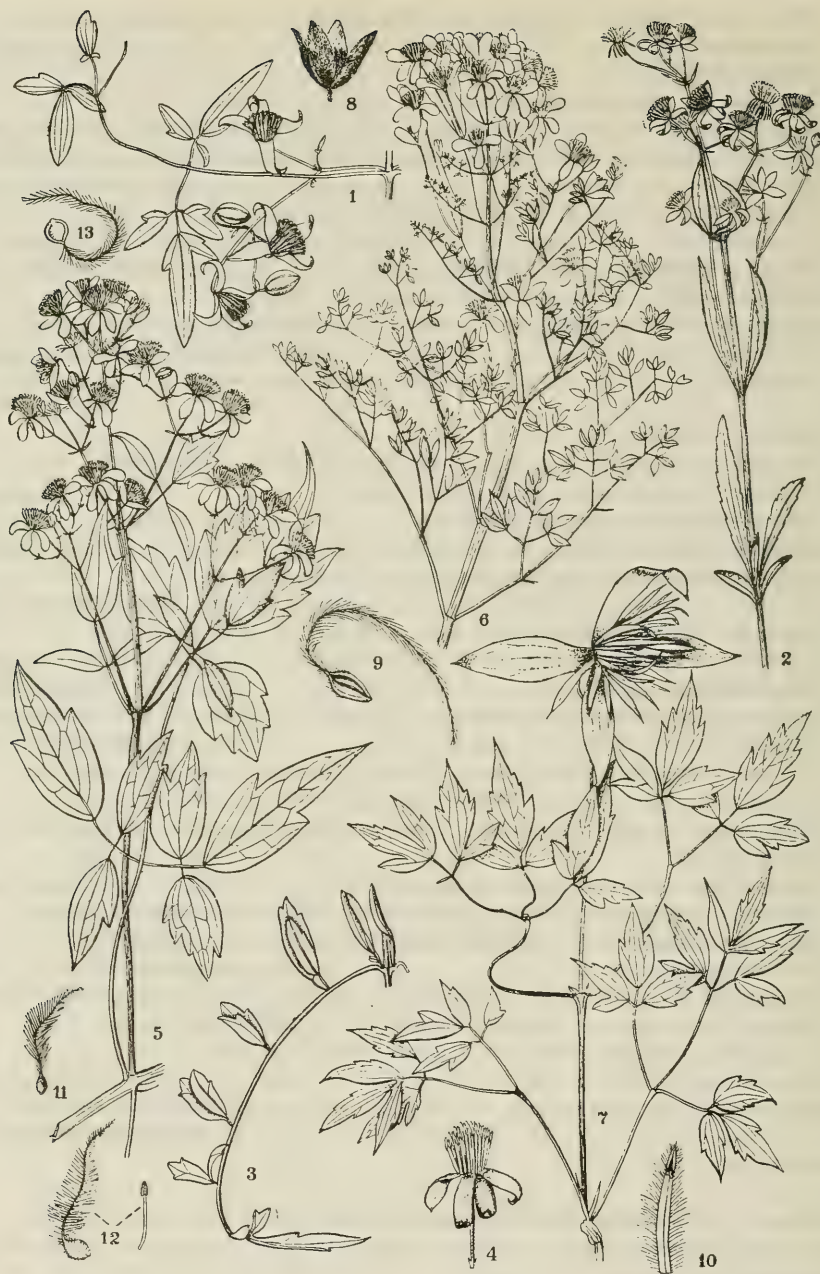


PLATE XX. 1 - *Clematis orientalis* L.; 2 - *C. songarica* Bge.; 3 - *C. asplenifolia* var. *boissieriana* (Korsh.) H. Krasch; 4 - *C. vitalba* L., flower; 5 - *C. brevicaudata* DC; 6 - *C. pseudoflammula* Schmalh; 7 - *Atragene macropetala* Ldb.; 8 - *Clematis fusca* Turcz., flower; 9, 10 - *C. integrifolia* L., flower, stamen; 11 - *C. manshurica* Rupr., fruitlet; 12 - *C. aethusifolia* Turcz., stamen and fruitlet; 13 - *C. pseudoflammula* Schmalh., fruitlet.

Perennial; stem erect, 30–60 cm high, simple or slightly branched, reddish brown, in lower part slightly and in upper part more densely white-pubescent; leaves entire, sessile, oblong-ovate or narrow-lanceolate (var. *angustifolia* O.Ktze.), coriaceous, with more or less prominent veins, glabrous above, more or less pubescent beneath especially along the veins and at the margins, 5–7 cm long; flowers solitary on long or short pedicels, more or less strongly nutant; sepals usually 4, lanceolate, sometimes prolonged at apex into a short point, black-purple or violet at the sides, more or less densely pubescent on the outside. June–July. (Plate XX, Figures 9 and 10).

Steppes, scrub, and forest margins. — European part: M.Dnp., U.Dnp. (S.), Bl., V.-Don, L.Don, Transv. (W.), Crim.; Caucasus: Cisc., Dag.; W.Siberia: Irt. (SE), Alt. (W.); E.Siberia: Ang.-Say. (W.); Centr. Asia: Balkh., Dzu.-Tarb. **Gen. distr.:** SE part of Centr. Eur., Bal.-As. Min., Dzu.-Kash. Described from Hungary. Type in Vienna.

2. *C. fusca* Turcz. in Bull. Soc. Nat. Mosc. (1840) 60; Ldb., Fl. Ross. I, 725; Maxim., Prim. Fl. Amur., 11; Kom., Fl. Manchzh. II, 286. — *C. kamtschatica* Bong. in Bull. Sc. Acad. Pétersb. VIII (1841) 339. — *C. viorna* var. *violacea* O.Ktze., Monogr. Clemat. (1885) 132. — *C. ajanensis* O.Ktze., l.c., 176. — Ic.: Gartenfl. (1864) tab. 455; Lav., Clem. tab. 20.

315 Perennial; stem sulcate, weak, to 2 m high, climbing, more rarely strong and erect, more or less densely pubescent at nodes; upper leaves sparsely hairy (mainly along the veins, more densely on the petioles), pinnatisect, sometimes with very long petioles functioning as tendrils, the leaf lobes diminishing in size from base to apex of leaf, long- or short-petioled, the lobes greatly varying in shape, ovate-lanceolate or lanceolate or ovate, more or less long-acuminate, entire or dentate or more or less deeply dissected into 2–3 lobes; pedicels short, stout, with a dense pubescence of grayish brown hairs, rarely glabrous; flowers nutant; sepals 4–6, dingy violet or grayish brown or red or brown, margins slightly revolute, oblong-ovate, 2–2.5 cm long, acuminate, with grayish brown hairs or glabrate above, a whitish pubescence is confined to the margin, glabrous beneath; filaments and dorsal surface of anthers covered with grayish brown hairs; fruitlets compressed, flat, pubescent, with a long grayish brown-yellow style. June–July. (Plate XX, Figure 8).

Meadows and waterside forests. — Far East: Ze.-Bu., Okh., Uda, Kamch., Sakh. **Gen. distr.:** Jap.-Ch. Described from China. Type in Leningrad.

Note. This species is distinguished by considerable polymorphism in the degree of pubescence, color of sepals, shape of leaf lobes, etc. It is separated into the following forms: var. *violacea* Maxim. — sepals dingy violet, glabrate beneath, the white pubescence confined to the margins, stems climbing; var. *manshurica* Rgl. — sepals with a dense pubescence of grayish brown hairs on the outside, stems climbing; var. *umbrosa* Kom. — sepals grayish brown with black nerves and hairs, leaves thin, flowers solitary with glabrous pedicels, stems climbing; var. *ajanensis* Rgl. et Til. — stems erect, not tall (30–40 cm), simple with 1 or 2 flowers, leaf lobes lanceolate.

3. *C. aethusifolia* Turcz. in Bull. Soc. Nat. Mosc. V (1832) 181; Maxim., Prim. Fl. Amur., 469 et in Mém. biolog. IX, 586; Kom., Fl. Manchzh. I, 279. — *C. nutans* var. *aethusaefolia* et var. *latisecta* O. Ktze., Monogr. Clemat. (1885) 129. — *C. latisecta* Prantl in Engl., Bot. Jahrb. IX (1888) 258. — Ic.: Gartenfl. (1861) tab. 432.

Perennial, covered throughout with rather sparse appressed hairs; stem low, erect, 20–40 cm, more rarely higher, climbing, faceted leaves 2–3-pinnatisect, varying greatly in degree of dissection and in width of terminal lobes, the primary lobes more or less long-petioled, parted into ternate lobules of varying width, these linear to rhombic, broadly cuneate, very densely pubescent beneath, with incised-serrate margin; flowers small, nutant, whitish, narrowly campanulate; sepals 4, oblong, short-acuminate, 1.5–2 cm long, with a dense white marginal pubescence beneath; filaments linear, pubescent; fruitlets mostly densely pubescent, flattened with a convex margin; style 1.5–2 cm long. July–August. (Plate XX, Figure 12).

316 Gravelly taluses on riverside slopes, dry open rocks. — E. Siberia: Ang.-Say. (southern border area); Far East: Ze.-Bu., Uss. Gen. distr.: Ch., Mong. Described from N. China. Type in Leningrad.

Note. In the USSR there occurs a more strongly pubescent broad-leaved form (v. *latisecta* Maxim.), from which the typical North China form is distinguished by its more compound leaf and narrower lobes.

Section 2. *VITICELLA* Prantl in Engl. Pflanzenfam. III, 2 (1891) 63. — Inflorescence usually paniculate, flowers open, flat, sepals and stamens nutant.

4. *C. viticella* L., Sp. pl. (1753) 543; Ldb., Fl. Ross. I, 4; Boiss., Fl. Or. I, 2; N. Busch in Fl. cauc. crit. III, 108; O. Ktze., Monogr. Clemat. 136. — Ic.: Sibth. et Sm., Fl. Gr. tab. 516; Rchb., Ic. Fl. Germ. IV, tab. 65, f. 4668. — Russian name: lomonos fioletovyi [violet].

Perennial; stem climbing, slender, faceted, sometimes violet-frutescent, covered with hairs, more densely so at base of petioles; leaves pinnate with more or less distant petiolate ternate lobes, their lobules firm, slightly coriaceous, ovate or orbicular, entire or crenate-dentate or more or less deeply 1–3-partite, drawn out into a short sometimes curved point, with very prominent veins on both surfaces, more densely pubescent beneath; flowers solitary, on long pedicels; sepals dark violet or red, large, to 3 cm long, to 2.8 cm broad, obovate with a broad undulate-dentate margin, glabrous above, with a short down beneath; fruitlets flat, densely pubescent, the short style glabrous in upper part. Fl. July.

Rocky slopes, scrub, and hedges. — Caucasus: W. Transc. Gen. distr.: W. Med., Bal.-As. Min., Iran. Described from S. Europe. Type in London.

Economic importance. Frequently cultivated as an ornamental plant in southern regions of the USSR.

5. *C. songarica* Bge., Del. Semin. Horti Dorpat. (1839) 8; Ldb., Fl. Ross. I, 2. — *C. gelberiana* Bong. in Bull. Soc. Acad. Pétersb. VIII (1841) 338. — *C. recta* ssp. *songarica* O. Ktze., Monogr. Clemat. (1885) 112. — Ic.: Bong., l.c. — Exs.: Fl. turkest. ed. H. B. P. No. 12.

Shrub; slightly pubescent or glabrous, 40–90 cm high, with an erect whitish costate stem; leaves 3–8(–12) cm long, glaucous green, rather thick, slightly fleshy, rugose-punctate when dry, entire, lanceolate or linear, narrowed at base into petiole, entire (var. *integrifolia* Trautv.) or more or less serrate-dentate (var. *gebleriana* O.Ktze.); flowers numerous; small, generally in a profusely branched compound paniculate inflorescence; sepals 1–2 cm long, oblong-obovate or elliptic, glabrous above and with a short down beneath, white; filaments narrow-linear, glabrous, as long as or shorter than anthers; fruitlets compressed, densely pubescent; style 2–3 cm long, plumose-pubescent. July–August. (Plate XX, Figure 2).

Stony slopes and mountain taluses. — Centr. Asia: Dzu.-Tarb., Balkh. (S.), T. Sh., Syr-D., Pam.-Al. Gen. distr.: Mong. Described from Dzungaria.

6. *C. asplenifolia* Schnrek, Enum. plant. nov. II (1842) 68; Boiss., Fl. Or. I, 3. — *C. songorica* var. *asplenifolia* et *intermedia* Trautv., Enum. pl. songor. (1860) 56. — *C. boissieriana* Korsh. in Bull. Acad. Sc. Pétersb. IX, No. 5 (1898) 400. — *C. songarica* var. *boissieriana* B. Fedtsch., Consp. fl. turk. I (1905) 1.

Perennial undershrub; stem erect, often whitish; leaves rather thick, somewhat coriaceous, the lower and middle leaves large (5–12 cm long), entire, broad-lanceolate or oblong-lanceolate or lanceolate or linear-lanceolate in outline, entire or irregularly serrate-dentate, cuneate, sometimes deeply incised, with more or less long petioles; upper (and sometimes also middle) leaves pinnatifid with more or less profusely divided large or small oblong-obovate-lanceolate lobes, entire or apically incised-dentate; terminal lobe larger, oblong-lanceolate, coarsely serrate or incised-dentate or subentire, gradually passing into petioles or confluent with upper lateral lobules, sometimes the upper leaves longer, reclinate, with small lobules on a short petiolule (var. *boissieriana* (Korsh.) H. Krasch.); flowers small, in a narrow paniculate inflorescence; sepals oblong, whitish, densely short-pubescent beneath or only at the margin; filaments linear, glabrous; fruitlets small, pubescent; style 1.5–2 cm long, plumose-pubescent. July–August. (Plate XX, Figure 3).

Stony mountain slopes. — Centr. Asia: Balkh., Dzu.-Tarb., T. Sh., Pam.-Al., Amu D., Syr D. Gen. distr.: Afghanistan, Dzu.-Kash. Described from Dzungaria. Type in Leningrad.

7. *C. ispahanica* Boiss., Diagn. pl. or. nov. ser. I, VI (1845) 3; Boiss., Fl. Or. I, 3. — *C. pseudoorientalis* O.Ktze., Monogr. Clemat. (1885) 165, 171, p.p. — *C. reta* ssp. *ispahanica* O.Ktze., l.c., 112.

Perennial; stems erect or climbing, in upper part whitish like the branches, costate; leaves coriaceous, rather thick, the lower entire, sometimes with incised-margin, the remainder pinnatisect, sometimes with petioles functioning as tendrils, the upper leaves frequently arcuately recurved, the lobes more or less distant, the lateral lobes 1–4 cm long, lance-linear or linear, else 3–5-lobuled or entire with only few obscure denticles, with long (1–2 cm) petiolules; flowers small, in a long branched peniculate inflorescence; sepals yellowish white, elliptic-lanceolate, down beneath at the margin, sometimes over the whole surface; fruitlets compressed,

pubescent; style 3–4 cm long, with a shorter plumose pubescence at the apex. July–August.

Scrub on steppe slopes. — Centr. Asia: Mtn. Turkm. (Kopet Dagh).

Gen. distr.: Iran. Described from S. Iran. Cotype in Leningrad.

8. *C. hexapetala* Pall., Reise III, Anhang (1772) 735 (non L. fil. Suppl. pl. syst. veg. 1781). — *C. angustifolia* DC., Prodr. I (1824) 7, non Jacq.; Ldb., Fl. Ross. I, 2; Turcz., Fl. baic.-dahur., I, 24; Kom., Fl. Manchzh., II, 282. — *C. lasiantha* Fisch. in DC., Syst. I (1818) 154. — *C. gmelini* L., Syst. nat. II (1791) 873. — Ic.: Pall., l.c., tab. Q. — Vernacular name: Kopylovnik.

Perennial — stem erect, strong, faceted, 30–70 cm high; leaves short-petioled, ternate or 1–2-pinnately dissected into linear or linear-lanceolate acuminate more or less coriaceous lobes with very prominent veins, glabrous or covered with sparse hairs; flowers solitary or in a terminal compound corymbiform inflorescence; sepals 4–8, 2–2.5 cm long, obcuneate or oblong-obovate, rounded at the apex, white or yellowish with a sericeous tomentum on the outside; filaments glabrous. June–July.

Steppe and frequently stony slopes, shrub thickets, riverside alluvial deposits and neglected fields. — E. Siberia: Ang.-Say. (Baikal area), Dau.; Far East: Ze.-Bu., Uss. **Gen. distr.:** Jap.-Ch., Mong. Described from Transbaikalia (Dauria). Type in Leningrad.

9. *C. recta* L., Sp. pl. (1753) 767; Ldb., Fl. Ross. I, 2; Boiss., Fl. Or. I, 3; Schmalg., Fl. I, 4; N. Busch in Fl. cauc. crit., III, 108. — *C. recta* var. *normalis* O. Ktze., Monogr. Clem. (1885) 111, p.p. — *C. lathyrifolia* Bess. ex Rchb., Fl. Germ. excurs. (1831) 134. — Ic.: Jacq., Fl. austr., tab. 291; Rchb., Ic. Fl. Germ. IV, f. 4664 (sub *C. erecta* L.). — Exs.: HFR No. 1351.

Perennial; stem erect, herbaceous, finely sulcate, short-pubescent in upper part (more densely so at the nodes); leaves somewhat azure-green, pinnate, with sulcate glabrous or slightly pubescent petioles; leaflets 2–4 pairs, more or less distant, short-petioled, ovate, large (to 9 cm long), acuminate, cuneately or slightly cordate, usually entire, with prominent veins beneath, glabrous and darker above; flowers numerous, in a compound corymbiform inflorescence; sepals 4, milky white, small, 8–15 mm long, narrow-ovate or oblong-obcuneate, with a narrow border of short down beneath, glabrous above; anthers glabrous; fruitlets glabrate, compressed, with a rather short plumose-pubescent style. June–July.

319 Scrub, forests, and river valleys. — European part: Bl., U. Dnp., U. V., V. Kama. Transv. (?), M. Dnp., V.-Don, L. Don, Crim.; Caucasus: Cisc., E. Transc. **Gen. distr.:** W. Med., Centr. Eur., Bal.-As. Min. (W.). Described from Central Europe. Type in London.

10. *C. manschurica* Rupr. in Bull. phys.-math. Acad. Pétersb. XIV (1857) 514; Maxim., Prim. Fl. Amur. 10; Kom., Fl. Manchzh., II, 282. — *C. recta* var. *mandshurica* Maxim. in Mém. biolog. IX (1876) 594; O. Ktze., Monogr. Clemat., 114. — Ic.: Mém. Acad. Sc. Petersb., s. VII, 4, tab. 2 (1861).

Perennial; stems decumbent or climbing on surrounding shrubs by means of tendril-like petioles, branched, costate, herbaceous; leaves

pinnatisect with distant entire or ternately dissected primary lobes, their lobules sessile or petiolate, slightly coriaceous, lance-ovate, cuneate or cordate, short-acuminate, with very prominent veins and sparse hairs beneath, the upper leaves frequently ternate; flowers small, numerous, in terminal or axillary inflorescences; pedicels with small narrow bracts; sepals white, oblong, to 1.5 cm long, more or less strongly tapering toward base, with a dense white pubescence at the margin beneath; anthers linear, glabrous; fruitlets compressed, glabrous, with a thickened margin; style to 3 cm long. July–August. (Plate XX, Figure 11).

Dry slopes, forest margins, shrub thickets, sparse broadleaf forests, meadows, and sandy riverbanks. — Far East: Ze.-Bu., Uss. Gen. distr.: Jap.-Ch. Described from Manchuria. Type in Leningrad.

11. *C. flammula* L., Sp. pl. (1753) 544; Ldb., Fl. Ross. I, 3; Boiss., Fl. Or. I, 4; N. Busch in Fl. cauc. crit. III, 108. — *C. recta* ssp. *flammula* O. Ktze., Monogr. Clemat. (1885) 115. — Ic.: Rchb., Ic. Fl. Germ. IV, tab. 63, f. 4666.

Perennial; stem climbing, weak, costate; leaves bipinnatisect, their lobes small, ovate or oblong, entire or 2–3-lobuled; flowers small, numerous, in a more or less elongate panicle inflorescence; sepals 4–10 mm long, white, oblong, obtuse, short-pubescent at the margin on the outside; filaments glabrous; fruitlets glabrous or pubescent; style to 2 cm long, with a shorter pubescence at the apex. June–July.

Scrub and forests, climbing high into trees. — Caucasus: W. Transc. Gen. distr.: Med., Bal.-As. Min., Iran. (Afghanistan, W. Baluchistan), N. Africa. Described from S. Europe. Type in London.

12. *C. pseudoflammula* Schmalh. ex Lipsky in Zap. Kievsk. Obshch. Estestv. XII (1894) 230; Shmal'g., Fl. I (1895) 4; N. Busch in Fl. cauc. crit. III, 109. — *C. flammula* M. B., Fl. taur.-cauc. II, 21; III, 377, non L. — Vernacular name: zhigunets.

Perennial; stem erect, strong, more or less flexuous in upper part, herbaceous, 30–60 cm high, finely costate, slightly pubescent; leaves bipinnatisect with rounded faceted more or less strongly pubescent petioles, their lobes oblong-ovate or oblong-linear, small, 1–3 (rarely to 5) cm long, entire or more or less deeply bipartite, glabrous, or slightly pubescent, with very prominent veins beneath; sepals whitish, narrowly obcuneate, 10–15 cm long, with a short-pubescent stripe at the margin beneath; anthers glabrous; fruitlets flat, laterally concave in central part with a thickened margin; style long, plumose-pubescent. June–July. (Plate XX, Figure 6).

Steppes, steppe slopes, among steppe shrubs, sometimes in cultivated and unused fields. — European part: Bl., L. Don; Caucasus: Cisc., Dag. Endemic. Described from the Northern Caucasus. Type in Leningrad.

13. *C. vitalba* L., Sp. pl. I (1753) 544; Ldb., Fl. Ross. I, 3; Boiss., Fl. Or. I, 4; O. Ktze., Monogr. Clemat., 99; N. Busch in Fl. cauc. crit. III, 111. — Ic.: Jacq., Fl. austr., tab. 308; Rchb., Ic. Fl. Germ., IV, f. 4667.

Perennial; stem tall, climbing, with strongly pronounced ribs, more or less strongly pubescent at the nodes; leaves with long petioles often functioning as tendrils, imparipinnate, usually with 2 pairs of more or less

distant lobes and a terminal lobe, the lobes short-petioled, ovate, rarely entire, more often with large teeth or rather deeply cleft into irregular lobules, with sparse hairs on both surfaces especially along the veins; flowers numerous, in a compound corymbiform inflorescence, with small leaflets subtending in ramifications; sepals small, to 10 mm long, oblong, obtuse, white, with a dense white tomentum on both surfaces; anthers glabrous. Fl. June–July. (Plate XX, Figure 4).

Forests, shrubs, and stony slopes. — European part: Crim.: Caucasus: Cisc., W., S., and E. Transc. Gen. distr.: Atl. Eur., Med., Bal.-As. Min. Described from Europe. Type in London.

14. *C. brevicaudata* DC., Syst. I (1818) 138 et in Prodr. I (1824) 3; Maxim. in Mém. biolog. IX, 562; Kom., Fl. Manchzh., II, 280. — Ic.: Schneid., III. Handb. Laubh. I, f. 191; Gard. et Forest., V (1892) 139.

321 Shrub; stems climbing, numerous, forming dense entanglements; leaves pinnate, their lower lobes ternately parted, the remainder entire, the lobules ovate-lanceolate, long-acuminate, their margins sinuate-serrate, with veins concave above, convex beneath, usually glabrous, more rarely slightly pilose; flowers small, in elongated many-flowered inflorescence; pedicels more or less pubescent; sepals white or straw-colored, to 1.5 cm long, pubescent on the outside; filaments glabrous; fruitlets slightly compressed, more or less strongly pubescent; style to 3 cm long. July. (Plate XX, Figure 5).

Shrub thickets, forest margins, riverbanks, and stony slopes. — Far East: Ze.-Bu., Uss. Gen. distr.: Jap.-Ch., Mong. (W.). Described from China. Type in Geneva.

15. *C. glauca* Willd., Herb. Baumzucht (1796) 65; Ldb., Fl. Alt. II, 373; Ldb., Fl. Ross. I, 3. — *C. daurica* Pers., Synops. II (1807) 99. — *C. davurica* Ldb., Fl. Ross. I (1842) 4. — *C. orientalis* Kryl., Fl. Zap. Sib. V, 45, non L. — Ic.: Willd., l.c., tab. 4, f. 1.

Shrub; stem climbing, costate, sometimes reddish lilac, glabrate or with a short down, 2–5 m long; leaves blue-green, 1–2-pinnatisect, with long slender petioles functioning as tendrils; primary lobes with long slender petioles, either entire, ovate or elliptic, or longer and lance-linear, more rarely the lobes trifid or tripartite, with ovate and lanceolate 1–4-cm long lobules; flowers yellowish white or greenish white, frequently reddish on the outside, in smallish paniculate inflorescences borne in the axils of leaves; sepals ovate-lanceolate, acuminate, with a dense short down at the margins, glabrous or glabrate on the outside, sometimes pubescent on the inside, 1.5–2 cm long; fruitlets flattened, pubescent; style plumose, 3–9 cm long. July–August.

Steppe shrub thickets, stony slopes along rivers and meadow riparian thickets. — W. Siberia: Alt., Irt. (SE); S. Siberia: Ang.-Say.; Centr. Asia: Dzu.-Tarb., T. Sh. Gen. distr.: Mong., China. Described from Altai. Type in Berlin.

Note. We have restored this species, which was earlier described by Willdenow, since it is satisfactorily distinguished from *C. orientalis* L. In fact, they may be confused only in Tien Shan, i.e. in an area where the two species grow in the same habitat and are probably linked by transitional forms.

16. *C. serratifolia* Rehder in Mitt. deutsch. Dendrolog. Gesell. (1910) 248 et in Bailey, Stand. Cycl. Horticult. (1914) 798. — *C. orientalis* var. *serrata* Maxim. et var. *wilfordi* Maxim. in Mél. biolog., IX (1876) 583. — *C. intricata* var. *C. wilfordi* et var. *serrata* Kom., Fl. Manchzh. I (1901) 289. — *C. serrata* Kom. et *C. wilfordi* Kom. in Kom. and Alis., Oprod. rast. Dal'nevost. kr., I (1931) 549. — Ic.: Kom. and Alis., l.c., tab. 168 (sub *C. wilfordi* Kom.).

Shrub; stems more or less long, climbing and profusely branched or decumbent and simple; leaves ternately parted, their petioles long, slender, sometimes functioning as tendrils; leaf lobes ovate-lanceolate or ovate-elongate, long-acuminate, irregularly serrate-dentate with few (2–3) incisions; flowers few, 1–5 per node, more or less widely horizontally gaping, smallish, on long pedicels; sepals ovate-elongate or elliptic, to 2 cm long, acuminate, arachnoid-villous beneath and at the margins; filaments long-ciliate below, slightly dilated toward base; fruitlets pubescent, compressed, cuneately tapering toward base. August–September.

Mostly thickets in open localities with stony gray soil, river pebbles, and waterside scrub. — Far East: Uss. **Gen. distr.:** Korea. Type in the Arnold Arboretum.

Note. Besides the form with a climbing stem found in shady habitats, in open places there is a form with decumbent slightly branched stems and solitary flowers, with sepals densely pubescent on the outside (var. *wilfordi* Maxim.).*

17. *C. orientalis* L., Sp. pl. I (1753) 543; Ldb., Fl. Ross I, 3; Boiss., Fl. Or. I, 3; Shmal'g., Fl. I, 4; N. Busch in Fl. cauc. crit., III, 112. — *C. longicaudata* Ldb., Fl. Ross. I (1842) 3. — Ic.: Dillen., Hort. Eltham. tab. 119, f. 145. — Exs.: Herb. Fl. cauc. No. 119; H. F. A. M. No. 134.

Perennial, more or less densely crisp-pubescent or glabrate throughout; stem climbing, costate, sometimes reddish; leaves pinnatisect, light gray-greenish, slightly thickish and rigid, greatly varying in shape, width, and degree of dissection of the ovate or oblong or lanceolate or linear primary lobes, these are usually ternately dissected into 2 short lateral and a longer median lobule, the lobules entire or dentate, obtuse or apiculate; flowers in smallish paniculate inflorescences, in axils of leaves; sepals 4, yellowish, often reddish on the outside, with a short tomentum on both surfaces (denser on the inside and at the margins), oblong-lanceolate or narrowly ovate-lanceolate, long-acuminate, frequently hamately curved at the apex, 1.5–2.5 cm long; fruitlets compressed, with a thickened edge, pubescent; style 5–10 cm long; filaments dilated toward base, more or less pubescent. Fl. July–August. (Plate XX, Figure 1).

Riverbanks, riparian forests, scrub, gullies, slopes, and sand depressions in the semidesert and desert zones. — European part: L. V., Crim.; Caucasus — Cisc., Dag., S., E., and W. Transc.; Centr. Asia: Ar.-Casp., Balkh., Kara K., Kyz. K., Mtn. Turkm., Amu D., Pam.-Al., Syr D., T. Sh. **Gen. distr.:** E. Med., Bal.-As. Min. (E.), Iran, Baluchistan, Tib., Mong., China. Described from China. Type in London.

* These are undoubtedly two different species. — V. Komarov.

18. *C. tangutica* (Maxim.) Korsh. in Bull. Acad. Sc. Pétersb. IX, No. 5 (1898) 575. — *C. orientalis* var. *tangutica* Maxim., Fl. tangut. I (1889) 3. — Ic.: Bot. Mag. tab. 710 (1900); Maxim., Rev. hort. LXXIV (1900) 528.

323 Shrub; stem profusely branched, decumbent (rarely erect or climbing), the branches straight, often reddish, angularly costate, pubescent; leaves pinnatisect, glabrous, light green, with few more or less distant lobes, these ovate or ovate-lanceolate in outline, serrate or incised, usually ternate, the lateral lobes short, sometimes tapering into short petiolules, the terminal lobe larger, more or less long-acuminate; flowers terminal or at the nodes, solitary, large, on long pedicels; sepals light yellow, ovate, slightly white-pubescent on the outside, more densely so on the inside, with an even denser white tomentum at the margin; filaments flat, densely ciliate in lower part, almost smooth above; fruitlets compressed, pubescent, with a long white-pubescent beak. July–August.

Stony slopes, taluses, and pebbles of river valleys in the upper mountain zones. — Centr. Asia: Pam.-Al. (E.), T. Sh. (E.). Gen. distr.: Dzu.-Kash., Mong. Described from Tibet. Type in Leningrad.

Genus 311. **MYOSURUS** * L.**

L., Sp. pl. (1753) 284.

Sepals 5, pale yellow, deciduous, with a short subulate basal spur; petals 5, in the form of nectaries with a narrow oblong-ovate lamina, with a nectar pit at its base, passing into a long filiform claw; stamens 5–29, 1-seeded nutlets numerous, triquetrous, crowded on receptacle which greatly elongates in fruit. Small annuals with entire leaves.

1. *M. minimus* L., Sp. pl. I (1753) 284; Ldb., Fl. Ross. I, 26; Boiss., Fl. Or. I, 19; Shmal'g., Fl. I, 12; N. Busch in Fl. cauc. crit. III, 114; Kryl., Fl. Zap. Sib. V, 1173. — Ic.: Rchb., Ic. Fl. Germ. fig. 4569. — Exs.: HFR No. 402.

Annual, small (2–10 cm), glabrous; roots filiform, numerous; radical leaves narrow-linear, obtuse, gradually tapering into petioles; scapes arising from leaf axils, 1-flowered, as long as or longer than leaves; sepals whitish green; petal-nectaries whitish yellow, 2.5–3.5 mm long; beak of fruitlet short, erect, directed upward. Fl. April to mid-June.

324 Cultivated and neglected fields, roadsides, ditches, gully slopes, pastures in the forest zone, meadows and mochezhinat and in the steppe and semi-steppe zones where water stagnates in spring; locally in masses. — European part: all regions (except the far (arctic) north); Caucasus: Cisc., S. Transc., Tal., W. Siberia: U. Tob., Ob (S.), Irt., Alt.; Centr. Asia: Ar.-Casp., Balkh., Mtn. Turkm. Gen. distr.: throughout Europe (except the Arctic), N. Am., N. Afr., Aust. Described from Europe. Type in London.

* From the Greek *myos*, a mouse, and *ura*, a tail.

** Treatment by I. M. Krashennikov.

† [Permanently wet land resulting from outflow of underground water.]

Genus 532. **CERATOCEPHALUS*** MOENCH.**

Moench, Mech. (1794) 218.— Subgen. *Ceratocephalus* Prantl in Engl. Bot. Jahrb. IX (1887) 265.

Perianth double, with 5 sepals; petals yellow, with a basal nectariferous gland covered with scales; fruitlets massive, producing a compact oblong or elongated cylindrical head, firmly united with receptacle, with 2 basal hollow protuberances, produced into a long lanceolate beak. Small annuals with palmatipartite leaves and slender roots; leaf lobes linear.

1. Beak of fruitlet almost straight 1. *C. orthoceras* DC.
+ Beak of fruitlet ensiformly curved from base 2. *C. falcatus* Pers.

1. *C. orthoceras* DC., Syst. I (1818) 231; Prodr. I, 26; Ldb., Fl. Ross. I, 26; Boiss., Fl. Or. I, 58.— *C. glaber* (Beck.) Janisch., Zam. po fl. El't. (1926) 6.— *Ranunculus orthoceras* Benth. et Hook. ex Shmal'g. I (1886) 14.— *R. testiculatus* M. B., Fl. taur.-cauc. III (1819) 386.— *R. falcatus* M. B., l. c., II, p. 29, non Pers.— Ic.: Stev. in Bul. Soc. Nat. Mosc. XXV (1852) tab. VII, b., Janisch., l. c. tab. 1.

Annual, small, 1–7 cm high, with dense white hairs or almost tomentose-lanate, more rarely glabrous (var. *glaber* Beck.); leaves palmately 3-parted into entire or 2–3-lobuled lobes; peduncles as long as or longer than leaves, arising from axils of leaves; stamens 5–15; receptacle long-cylindric; fruitlets pilose, with an almost straight beak not hamately recurved at apex. March–May.

Steppes and deserts, clayey and sandy soil, dry slopes, and pebbly and solonchik places; sometimes as a weed in fields.— European part: M. Dnp., V.-Don, Transv., Bl., Crim., L. Don., L. V.; Caucasus: all regions; W. Siberia: Irt., Alt.: Centr. Asia: Ar.-Casp., Balkh., Dzu.-Tarb., Kyz. K., Kara K., Mtn. Turkm., Amu D., Syr D., Pam.-Al., T. Sh. **Gen. distr.:** Centr. Eur., Bal.-As. Min., Arm.-Kurd., Iran. Described from the Crimea. Type in Geneva.

2. *C. falcatus* Pers., Syn. (1805) 341; Ldb., Fl. Ross. I, 26; Boiss., Fl. Or. I, 58.— *C. incurvus* Stev. in Bull. Soc. Nat. Mosc. XXI (1848) 269.— *C. platyceras* Stev., l. c. (1848) 269.— *C. leiocarpus* Stev., l. c., (1848) 269.— Ic.: Jacq., Fl. Austr. Ic. I (1773) tab. 48; Rchb., Fl. Germ. III (1838–1839) f. 4570; Stev. in Bull. Soc. Nat. Mosc. XXV (1852) tab. VII, f. 7 (sub nom. *C. incurvus*, *C. falcatus*, *C. platyceras*, *C. leiocarpus*); Janisch., Zam. po fl. El't. (1926) t. I, f. 2.

Annual, small, lanate, resembling the preceding species, from which it is distinguished by the broader falcately curved and apically hamate beak of the densely pilose or glabrate fruitlets; peduncles as long as or longer than the leaves; entire plant densely lanate, sometimes glabrate (var. *vulgaris* Boiss.) as also the fruitlets; beak of fruitlets falcately curved from base, rather broad (var. *vulgaris* Boiss.) or else rather narrow, more or less straight from the base and curved from the middle; the entire plant densely pilose (var. *incurvus* Boiss.). March–April.

Dry slopes, steppes, sandy and argillaceous deserts, and weed-infested places.— European part: L. V., Crim.; Caucasus: all regions: Centr. Asia: Ar.-Casp., Balkh., Dzu.-Tarb., Kara K., Kyz. K., Mtn. Turkm.,

** From the Greek *cerato*, horny and *cephale*, a head.

* Treatment by P. N. Ovchinnikov.

Amu D., Syr. D., Pam.-Al., T. Sh. Gen. distr.: Centr. Eur., Med., Bal.-As. Min., Iran, Ind.-Him. Described from Europe. Type in London.

Note. This ephemeral annual shows extremely great variation. On this basis Steven (Bull. Soc. Nat. Mosc. XXI, 1848, p. 269) separated as distinct species: *C. leiocarpus* Stev. from the Lower Volga region (var. *vulgaris* Boiss.—see above); *C. incurvus* Stev. (var. *incurvus* Boiss.) with pubescent fruitlets and with beak straight from base, curved from the middle — from the Crimea and Transcaucasia; *C. platyceras* Stev., closely related to the preceding, with peduncles nearly as long as the leaves (in *C. incurvus* the peduncles are longer than the leaves). D. E. Yanishevskii (l.c.) corroborates the independence of these forms and describes as a separate species, *C. glaber* (l.c.), which, unlike the other forms, can poison grazing animals.

Genus 533. **OXYGRAPHIS** * BGE.**

Bge., Suppl. Alt. (1836) 46; Freyn in Flora XLV (1887) 136–142.

326 Perennials, sepals 5, more or less coriaceous, persistent in fruit, firmly embracing the fruiting head; petals (nectaries) 10–15, oblong-linear or linear; stamens numerous, with short almost round anthers; fruitlets numerous, clustered on a hemispheric receptacle into a compact oval head, cartilaginous-coriaceous, dorsally somewhat compressed, with few (to 5) prominent small oblong ribs on each side, and above the middle a straight acuminate-subulate upright beak appearing as a continuation of the vein which is sharply pronounced on the keel. Small high-mountain, mainly Middle Asian plants, reaching the Himalayas in the south and Kamchatka in the northeast, with characteristic crowding of leaves at base of short straight peduncles; creeping shoots absent.

1. Leaves entire; fruitlets without a conspicuous border; flowers yellow, many-petaled 1. **O. glacialis** (Fisch.) Bge.
- + Leaves tripartite and trifid; fruitlets with narrowly winged borders; flowers red or pink, 5-petaled 2.
2. Radical leaves parted into deeply separated petiolate segments; sepals usually covered with dark grayish brown hairs; flowers purple or pink 2. **O. vulgaris** Freyn.
- + Radical leaves more or less deeply parted into trilobate or subentire sessile segments; sepals usually covered with glossy rusty-rufous hairs; flowers purple 3. **O. chamissonis** (Schlecht.) Freyn.

Subgenus 1. **EU-OXYGRAPHIS** Freyn in Flora XLV (1887) 140; Prantl in Engl. Bot. Jahrb. IX (1888) 262.—Leaves entire or lobate; petals numerous, yellow; fruitlets without borders.

Note. Of the 3 or 4 species of this subgenus, *O. maximoviczii* (Pamp.) Ovcz., *O. polypetala* Hook. and possibly one or two as yet undescribed species are confined to the Himalayas and Tibet; only *O. glacialis* Bge. has a wider distribution area. It is encountered in

* From the Greek *oxis*, acute and *grapho*, I write.

** Treatment by P. N. Ovchinnikov.

the high mountains of Central Asia and Siberia as far as Kamchatka and Arctic Siberia.

1. *O. glacialis* (Fisch.) Bge. in Supplem. Alt. (1836) 46; Ldb., Fl. Ross. I, 47; Kom., Fl. Kamch. II, 149; Kryl., Fl. Zap. Sib. V, 1174. — *Ficaria glacialis* Fisch. ex DC., Prodr. I (1824) 44. — *Caltha glacialis* Spreng., Syst. II (1825) 660. — *Ranunculus kamtschaticus* DC., Prodr. I (1824) 43. — *Caltha camtschatica* Spreng., Syst. II (1825) 660.

327 Perennial, small, 1.5–6 cm high, quite glabrous, acaulescent, with a short ascending rootstock, its distal part covered with decayed petioles, with a bundle of long cordlike roots; the solitary peduncles strong, straight, rather stout, arising from base of plant; all leaves radical, their petioles about as long as the blades, broadened at base and with a basal membranous margin, the blade slightly fleshy, orbicular or broad-ovate or elliptic-oblong, obtuse, cuneate, 1–2 cm long and as broad or slightly narrower, entire or with obscure obtuse teeth; flowers solitary, to 1.5–2 cm in diameter; sepals 5, persistent in fruit, coriaceous, broad-ovate, obtuse, firmly appressed to and only slightly shorter than fruiting head, 5–8(9) mm long, 4–6 mm broad, with conspicuous nerves, glabrous; petals 11–15, oblong-elliptic or narrowly oblong, obtuse, 6–7 mm long, ca. 1.5 mm broad, 3–5-nerved, with a slightly concave, sometimes obscure basal nectariferous pit, tapering into an elongated claw one-third as long as the limb; stamens numerous, half as long as petals; anthers small, almost round; fruitlets numerous, inserted firmly at the base of the broad hemispheric alveolate receptacle, glabrous, oblong-elongate-elliptic, convex on the outside, flattish on the inside and concave, especially dorsally, with 5 small prominent acute ribs, tapering to a straight or somewhat curved subulate dark lilac acuminate beak with a slightly homate tip. June–July. (Plate XXXIV, Figure 1).

Gravel-and-lichen and stony tundra, damp alpine stone fields, banks of alpine streams, alpine glades, and sometimes on snowy patches; to a height of 4,800 m (in Pamir). — Arctic: Arc. Sib., Arc. Eur. (N. Urals), Chuk.; W. Siberia: Alt.: E. Siberia: Ang.-Say., Dau.; Far East: Kamch.; Centr. Asia: Dzu.-Tarb., Pam.-Al., T. Sh. **Gen. distr.:** Mong., Kashgaria-Mongolia. Described from Altai. Type in Leningrad.

Note. Plants from Central Asia are distinguished from Altai-Siberian plants by their larger sepals, longer petals, and narrower leaves. In some plants from Central Asia (from the Alai Range) the petals were much wider. More material may make it possible to recognize the Central Asian plants as a distinct variety.

Subgenus 2. **CRYMODES** A. Gray in Proceed. Americ. Acad. Arts a. Sc. (1886) 365; Freyn in Flora XLV (1887) 140. — Leaves compound-lobate; petals 5, white or purple or red; fruitlets with winged borders.

Note. Besides *O. vulgaris* Freyn and *O. chamissonis* Freyn, this subgenus also includes *O. andersoni* Freyn from the mountains of North America. Freyn's inclusion of *Ranunculus schaftoanus* (Aitsch. et Hemsl.) Boiss., is entirely unfounded. In fact, it appears that he had not actually seen this species of *Ranunculus*, but in referring it to *Oxygraphis*, relied on an erroneous description by Aitchinson and Hemsley.

2. *O. vulgaris* Freyn in Flora XLV (1887) 141. — *Ranunculus glacialis* L., Sp. pl. (1753) 777; DC., Prodr. I, 30; Ldb., Fl. Ross. I, 31, non *Oxygraphis glacialis* Bge. — Ic.: Rchb., Ic. Fl. Germ. III, tab. 17, f. 4584; Deg., Ostenf., Hayek, Ic. pl. alp. f. 2, tab. 22.

328 Perennial, 5–15 cm high; stems erect or ascending, 1- to few-flowered, sulcate, glabrous or with sparse somewhat rufous hairs; leaves radical, petiolate, glabrous; petioles with proximally broadened scarious sheaths becoming somewhat rufous-grayish brown-haired higher up; leaf blade 3-parted into petiolate or almost petiolate trisected segments with slightly dentate lobes; lower cauline leaves sessile or subsessile, deeply tripartite, the upper sessile, 3–5-parted into oblong-elliptic lobes; flowers to 1.6–2.5 cm in diameter, purple or pink, rarely white; petals 6–8; sepals ovate, more or less acuminate, densely covered with dark rufous-dark-brown hairs to 8–9 mm long; petals broad-obovate, slightly sinuate or slightly crenate, to 0.9–1.3 cm long; fruitlets 3–4 mm long, obliquely oblong-ovate, laterally compressed, margins with membranous wings, especially toward apex, the border gradually passing into a basally straight, distally somewhat curved beak. July–August. (Plate XXXIV, Figure 2).

Damp soil, near springs, bottom of high-altitude snow lakelets, etc.; in the Arctic zone and in the alpine mountain zone. — Arctic: Arc. Eur.; European part: Kar.-Lap. Gen. distr.: Arc., Scand., Centr. Eur. Described from Lapland. Type in London.

3. *O. chamissonis* (Schlecht.) Freyn in Flora XLV (1887) 141. — *Ranunculus chamissonis* Schlecht., Animadvers. bot. I (1819) 12; Ldb., Fl. Ross. I, 31; Kom., Fl. Kamch. II, 147. — Ic.: Schlecht., l. c., tab. 1.

Perennial, 8–22 cm high, with a bundle of fiberlike roots; stems single, simple, somewhat sulcate, glabrous below, with scattered long rufous hairs above; leaves radical, somewhat coriaceous, glabrous, petiolate, deeply tripartite, their lobes cuneate, distally broadened, 3-, rarely 2-lobuled, somewhat dentate, rarely entire, the lobules entire, rarely with very few teeth; petioles proximally broadened into membranous amplexicaul sheaths; cauline leaves sessile, cuneate-oblong, the lower and middle leaves tripartite or trilobate, the bracts entire, their lobules entire or subentire, all leaves covered with drooping somewhat rufous-glossy hairs; flowers 2–3 cm in diameter; sepals appressed, coriaceous, broad-ovate, 8–9 mm long, subobtuse-rounded; petals 10–15 mm long, almost rounded-obovate, crenulate; fruitlets 4–5 mm long, laterally compressed, with isolated veins somewhat curved, obliquely oblong-ovate, with lowermost 1 mm of beak straight and apex slightly curved, with isolated veins. June–July. (Plate XXXIV, Figure 3).

Muddy habitats on the banks of pools, dried out stream beds, and elsewhere. — Arctic: Chuk., An. Gen. distr.: Ber. Described from the shores of Lavrentiya Bay. Type in Berlin; cotype in Leningrad.

in Pittonia IV (1899-1901) 207; Kom. and Alis. Opred. 1 (1931) 524, 550.—*Oxygraphis* Sect. *Halodes* Prantl in Engl., Bot. Jahrb. IX (1888) 263.

Flowers yellow; sepals 5; petals (nectaries) 5-12; fruitlets numerous, closely appressed, 1.5-3 mm long, glabrous, with a series of prominent longitudinal veins more developed on one side than on the other, produced into a short straight or curved beak. Small plants with undeveloped stem, with upright 1-3-flowered scapes, and long slender basal creeping shoots rooting at the nodes; all leaves radical, in rosettes and at the nodes of shoots, orbicular or elliptic, simple, short-toothed.

Note. A small genus of 4-6 species distributed on solonchaks soils in Middle and eastern Asia, in North and Central America and in the extra-tropical regions of South America. According to Green, the relation between *Ranunculus* and *Halerpestes* is comparable with the relation between *Fragaria* and *Potentilla*. *Halerpestes*, like *Fragaria*, lacks a stem, but has a high capacity for vegetative propagation by the detachment of segments of the creeping shoots.

Some authors (for example, Prantl, l.c.) relate *Halerpestes* to *Oxygraphis*, but others (for example, Britton in Memoirs of the Torrey Botanical Club V, 1893-1894) relate it to *Cyrtorhyncha*. However, the inclusion of all three genera in one genus places undue emphasis on the outward resemblance of the fruitlets, which have longitudinal venation. *Oxygraphis* is an alpine plant, encountered mainly in Middle Asia. It has characteristic nondeciduous coarse coriaceous sepals, different structure of fruitlets, and no shoots. *Cyrtorhyncha*, first described by Nuttall in 1838, has little in common with *Halerpestes*, which has no shoots, a well developed stem, and different fruitlets and beaks, etc. Green believes that those who favor the union of these genera should refer them neither to *Oxygraphis* nor *Cyrtorhyncha*. Rather they should all be retained in *Ranunculus*.

The genus *Halerpestes* requires a detailed study of abundant material. However, it is already possible to recognize, among known species, at least 2 groups: 1) *Polypetalae*, with 5-8 considerably longer petals, 1-flowered scapes, and thick coarse leaves; this group includes *H. ruthenica*; 2) *Subumbellatae*, with more slender peduncles, often with 2-3 flowers, with 5-parted calyx and corolla; the petals (nectaries) about as long as the tepals (sepals). To this group belongs the American *H. cymbalaria* and the Asiatic *H. salsuginosa*.

1. *H. salsuginosa* (Pall.) Green in Pittonia IV (1900) 208.—*H. sarmentosus* Kom. in Kom. and Alis., Opred. rast. Dal'nevost. kr. I (1931) 550.—*Ranunculus salsuginosus* Pall., Reise III (1776) 213, 265.—*R. sarmentosus* Adams in Mém. Nat. Mosc. III (1834) 244.—*R. cymbalariae* Ldb., Fl. Alt. II (1830); Fl. Ross. I, 34, non Pursh.—*R. subsimilis* Printz, Veg. Sib. Mong. Gr. (1921) 239.—*Oxygraphis cymbalaria* Prantl in Engl. Bot. Jahrb. IX (1888) 263, ex pte; ej. in Natürl. Pfl. III, 2c 63 ex pte.—Exs.: H. F. A. M. No. 135.

* From the Greek *hals*, salt and *herpestes*, creeping.

** Treatment by P. N. Ovchinnikov.

Perennial, small, glabrous, with 12–50 cm long filiform creeping shoots rooting at the nodes, and slender 1-, rarely 2 or 3-flowered scapes; all leaves radical, cauline leaves [sic] long-petioled, the leaf blade somewhat fleshy, rounded-ovate or rounded-reniform, with a truncate, rounded or cuneate base, coarsely rounded-toothed or 3–8-lobate, the lobes obtuse, the middle one considerably larger than the others, 6–15 mm in diameter, one-sixth to two-fifths as long as the petioles; flowers yellow, small, 7–12 mm in diameter, with 5-parted calyx and corolla; sepals obtuse, glabrous, ovate, 3–5 mm long, 2.5–4 mm broad; petals about as long as sepals but somewhat narrower, 2–2.5 mm broad, oblong-ovate, narrowed into a short claw; fruiting head ovate-orbicular; receptacle oval-cylindric, short-pilose; fruitlets small, numerous, firmly set, oblong-obovate, laterally compressed, 1.3–1.6 mm long, with several prominent longitudinal veins and a short acute somewhat recurved beak. June–August. (Plate XXXIV, Figure 4).

Damp solonchaks, solonchaks, meadows, and springs. — W. Siberia: U. Tob., Irt., Alt.; E. Siberia: Ang.-Say., Lena-Kol., Dau.; Far East: Kamch.? Okh., Ze.-Bu., Uda, Uss., Sakh.?; Centr. Asia: Ar.-Casp., Balkh., Dzu.-Tarb., Syr D., Pam.-Al., T. Sh. **Gen. distr.:** Ind.-Him., Dzu.-Kash., Mong., Jap.-Ch. Described from Siberia. Type in Leningrad.

Note. The plant from North America described by Pursh as *R. cymbalaria* was distinguished by De Candolle from the Asiatic plants (*R. cymbalaria* var. *americanus* DC., Prodr. (1824) I, 33).

However, following the discovery of Adam's original description and even with the aid of Ledebour, the Asiatic and American plants were only recently distinguished. In *R. cymbalaria* the leaf blade is cordate-notched, more rounded, uniformly crenate-margined, the petals are somewhat different and the peduncles 2 or 3-flowered. All these differences were noted in 1921 by Printz, who made a detailed morphological comparison between this plant and the American *R. (Halerpestes) cymbalaria*.

Halerpestes salsuginosa varies greatly within its extensive Asiatic distribution area and also in its dimensions and in the shape and type of incision of the leaves. A careful investigation may reveal a group of heterogeneous varieties. Mention should also be made of the dwarf high-mountain form of this species recorded by Hooker (var. *alpina*).

2. *A. ruthenica* (Jacq.) Ovcz. comb. nova. — *Oxygraphis plantaginifolia* Prantl in Engl. Bot. Jahrb. IX (1888) 263. — *Ranunculus plantaginifolius* Murr. in Nov. Comment. Goetting. VIII (1777) 39; Ldb., Fl. Ross. I 33. — *R. ruthenicus* Jacq., Hort. Vindob. III (1776) 19; Kryl., Fl. Zap. Sib. V, 1190. — *R. salsuginosus* DC., Prodr. I (1824) 33, non Pall. — Ic.: Jacq., Hort. Vindob. III (1776) tab. 31; Murr. in Nov. Comment. Goetting. VIII, tab. 2. Exs.: HFR No. 1205 (sub nom. *Ranunculus plantaginifolius* Murr.).

Perennial, to 13–20(25) cm high; scapes remotely appressed-pilose; above-ground creeping shoots long (15–70 cm) slender; roots in the form of a bundle of elongated cordlike fibers; leaves radical except for several leaves on shoots, long-petioled, the leaf blade ovate or elliptic, coriaceous, cuneate or rounded, rarely somewhat cordate, with 3, rarely 5, broad rounded teeth at the apex, the middle tooth larger, 1.5–4 cm long, to 0.6–

2.5 cm broad, considerably shorter than the slightly pubescent or glabrous petioles; peduncles erect, strong, rather stout, simple, 1-flowered, rarely slightly branched, 2 or 3-flowered, mostly with one entire or subentire small sessile linear bracteole borne at the bifurcation; flowers to 2–2.5 cm in diameter, golden yellow; tepals 5, ovate, obtuse, pubescent on the outside, late-deciduous, 7–9 mm long, 3–5 mm broad; petals 7–12, longer than tepals, oblong-obovate, with prominent nerves, 8–13 mm long, 4–5 mm broad; anthers short, elliptic or rounded-elliptic; fruiting head globose-oval, 10–11 mm long, 8 mm wide; receptacle pilose; fruitlets numerous, densely crowded, small, to 3–3.1 mm long, glabrous, obovate, narrowed toward base, inequilateral, laterally compressed with a convex ventral side, with up to 12 prominent longitudinal veins more developed on one side, the beak straight or curved, erect to 0.5–0.7 mm, often apically hamate. June–August. (Plate XXXIV, Figure 5).

Damp solonchak and boggy meadows, solonchaks, and solonetzic lake-shores. — W. Siberia: Irt., Alt.; E. Siberia: Ang.-Say., Dau. Gen. distr.: Dzu.-Kash., Mong. Described from Siberia.

332 Genus 535. **FICARIA** * DILL.**

Dill. ex Haller, Enum. stirp. Helvet. I (1742) 321; Adans., Fam. II (1763) 509. — Subgen. *Ficaria* Boiss., Fl. Or. I (1857) 20.

Sepals 3, yellowish white or yellowish-greenish, finely scarious, glabrous; petals 8–12, linear-oblong or elliptic, with a basal nectariferous gland covered with scales; stamens and styles numerous; stigma sessile; embryo monocotyledonous;† fruitlets more or less rounded, inflated, with a tuberclelike compressed beak, often narrowly attenuate at base. Perennial herbaceous plants with fleshy tuberous roots and entire somewhat fleshy leaves; stems often abbreviated, abundantly covered below with scarious leaf sheaths. Russian name: chistyak.

Four out of 5–6 species of the genus *Ficaria*, whose main natural habitat is the Mediterranean region, are encountered in the USSR; only one of these, *F. verna*, is widely distributed.

1. Petals narrow-oblong or linear, to 1–2 mm broad; fruitlets glabrous. Small mountain plants 2.
- + Petals elongate-elliptic or elliptic, to 4–7 mm broad, bright yellow; fruitlets more or less pubescent 3.
2. Leaves cordate, lobate-cleft at the margin, mostly with 3-toothed lobes; stems abbreviated, usually not longer than the leaves 4. **F. ficarioides** (Bory et Shaub.) Hal.
- + Leaves cuneate or rounded-truncate or with a small incision hidden by the overlapping lower projections of the leaf, entire, often broadly and obtusely crenate at the margin; peduncles deflexed after flowering 3. **F. fascicularis** Koch.

* From the Latin word *ficus*, a fig tree or fig, referring to the shape of the thickened tuberous roots.

** Treatment by P. N. Ovchinnikov.

† In Sterck's opinion, the single cotyledon is due to the fusion of two cotyledons, as is the case in other "tuberiferous" genera (for example, *Corydalis*).

3. Leaves cordate-ovate in outline, the basal lobes overlapping or approximate, stem little developed, peduncles often almost radical. Plants usually without proliferating tubercles in leaf axils 2. *F. calthifolia* Rchb.
- + Leaves rounded-cordate or (especially the upper) triangular-cordate in outline, with a broad notched uncovered base, and mostly remote basal lobes, mostly notched, often angularly crenate at the margin; stems developed, usually branched, with several flowers 1. *F. verna* Huds.

333 1. *F. verna* Huds., Fl. Angl. ed. I (1762) 214. — *F. ranunculoides* Moench, Meth. (1794) 215; DC., Prodr. I, 44. — *F. vulgaris* Ruppius β ex Rupr., Fl. Cauc. I (1869) 97. — *Ranunculus ficaria* L., Sp. pl. (1753) 550, 774; Ldb., Fl. Ross. I, 30 (excl. var. β); Boiss., Fl. Or. I, 24; Schmal'g., Fl. I, 10 (excl. var. *calthaefolia*); Busch in Fl. cauc. crit. III, 3, 123 (ex pte); Kryl., Fl. Zap. Sib. V, 1184. — *R. calthae-folius* Jord., Obs. VI (1847) 2. Ic.: Rchb., Fl. Germ. f. 4572; Hegi, III Fl. III, tab. 118, f. 1. — Exs.: HFR No. 453; Pl. Finl. Nos. 295 et 664.

Perennial, 15–30 cm high, glabrous, with a developed leafy slender weak ascending simple or branched few-flowered stem and a bundle of ovoid or ovoid-oblong tuberous roots; leaves rounded-cordate or triangular-cordate, to 2–5 cm in diameter, the lower with large or notchlike angular crenate margin, long-petioled, the upper short-petioled, angularly cordate or lobate-notched; leaf blade somewhat fleshy, mostly broadly cordate-notched at base, with separated lobes, lustrous or glossy green above; in most plants tuberclelike proliferating bulbils develop in the axils of leaves (var. *bulbifera* Rchb.); flowers 2.5–3.5 cm in diameter; petals 8–10, yellow, glossy, elongate-elliptic or oblong-obovate, 10–18 mm long, 4–7 mm broad; fruitlets more or less rounded-obovate, pubescent, inflated at apex, tapering toward base, with a very short slightly acuminate or subobtusate beak. April–May.

Moist soil in meadows and steppe depressions, forest margins, more rarely broadleaf forests, scrub, parks, sometimes in fields, mainly in the meadow-forest zone. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U.V., V.-Kama, U.Dnp., M.Dnp., V.-Don, Transv., Bl. (N.), Crim., L.Don, L.V., Urals; Caucasus: Cisc. (N.), W. Transc.; W. Siberia: U. Tob.; Centr. Asia: T. Sh. (vicinity of Alma-Ata). **Gen. distr.:** Scand., Centr. Eur., Atl. Eur., Bal. Described from Europe. Type in London.

Note. Crimean-Caucasian plants are often intermediate between this and the following species.

Economic importance. In Western Eyrope young parts of these plants are often used as salad and condiment. When the fruits mature the plant dries out and becomes poisonous. The roots, leaves, and stem were formerly used as a remedy for chest diseases, hemorrhoids, and scurvy ("Radix et herba Chelidonii minoris").

2. *F. calthifolia* Rchb., Fl. Germ. excurs. (1830–1832) 718; Rupr., Fl. Cauc. I, 28; Boiss., Fl. Or. I, 24; Busch in Fl. cauc. crit. III, 3, 124. — *Ranunculus ficaria* var. β Ldb., Fl. Ross. I (1842) 30. — *R. ficaria* var. *calthaefolius* Schmalh., Fl. Yugo-Zap. Ross. (1886) 10. —

334 *Ficaria ledebouri* Grossh. et Schischk. in Grossg., Fl. Kavk. II (1930) 108. — Ic.: Rchb., Ic. Fl. Germ. III (1838–39) tab. 1. — Exs.: HFR No. 1357.

Perennial, 10–18 cm high; roots tuberously thickened, more or less oblong; leaves cordate-ovate, entire or slightly and irregularly crenate, often large, with basal lobes overlapping or approximate; petioles with broad long scarious sheaths; stems abbreviated, rather stout, usually profusely covered with leaf sheaths, aphyllous or with one leaf; scapes mostly radical; peduncles 1-flowered; sepals finely scarious, whitish-yellowish, more or less broad-ovate; petals 7–10, oblong-obovate, narrowed at base, to 15 cm long, 4–5 mm broad; fruitlets with a fine pubescence, somewhat compressed, convex at the sides, tapering-acuminate toward apex and toward base, obtuse at the apex. April–May.

Damp places and among shrubs. — European part: Bl., L. V. (vicinity of Kamyshin), Crim.; Caucasus: Cisc., W., S., and E. Transc., Dag. **Gen. distr.:** Centr. Eur. (S.), Med., Bal.-As. Min., Arm.-Kurd., Iran. Described from Europe. Type in Vienna (?).

3. *F. fascicularis* C. Koch in Linnaea XV (1841) 249; Rupr., Fl. Cauc. I, 28; Grossg., Fl. Kavk. II, 107. — *R. kochii* Ldb., Fl. Ross I (1842) 731; Busch in Fl. cauc. crit. III, 3, 124. — *R. edulis* Boiss. et Hohen. in Boiss., Diagn. Ser. 1, VIII (1849) 4; Boiss., Fl. Or. I, 25. — Exs.: Boiss. et Hohen. in Kotschy, Pl. Pers. bor. 1846; Pl. orient. exs. No. 182.

Perennial, 3–10 cm high, quite glabrous, with a bundle of tuberous roots gradually clavately thickening toward base, and mixed with profuse slender root fibers; leaves with flat petioles broadened toward base into elongated finely scarious sheaths, ovate or triangular-ovate in outline, at base oblique, unnotched or almost imperceptibly cordate, with a broadly crenulate or entire margin; stem abbreviated, with a row of finely scarious leafless scales at base, with a cluster of leaves above and one short peduncle subequal to or one-third to half as long as the stem, deflexed after flowering; sepals finely scarious, whitish-yellowish, ovate or oblong-lanceolate, somewhat saccately inflated at base, recurved after flowering; petals (6) 7–10, narrowly oblong-lanceolate, narrowed toward base, to 10–15 mm long, to 1–2 mm broad, pale yellow, with well developed parallel nerves; fruiting head small, short-ovate; fruitlets glabrous, rugose, oblong-elliptic, rounded at the apex, with a scarcely perceptible obtuse tuberclelike beak to 2 mm long. April–May.

Rock crevices and shady habitats at 1,000–2,100 m. — Caucasus: S. and E. Transc., Tal.; Centr. Asia: Mtn. Turkm. **Gen. distr.:** Arm.-Kurd., Iran. Described from the Caucasus: Type in Berlin — cotype in Leningrad.

335 4. *F. ficarioides* (Bory et Chaub.) Halacz, Consp. Fl. Graec. I (1901) 26. — *F. peloponnesiaca* Nym., Syll. (1854–1855) 179. — *Ranunculus ficarioides* Bory et Chaub., Fl. Péloponnese (1838) 34; Boiss., Fl. Or. I, 24. — *Ficaria edulis* Grossh., Fl. Kavk. II (1930) 108 (non Boiss.). — Ic.: Bory et Chaub., l. c., tab. XVI, f. 2.

Perennial, 4–9 cm high, glabrous, with a bundle of elongated roots tuberously thickened proximally; stems weak, shorter than or slightly longer than the leaves, 1-flowered; leaves ovate-cordate, incised-lobate,

with ovate-lanceolate 3-toothed lobes; stems abbreviated, at base of peduncles one leaf or a cluster of several often almost trilobate or resembling radical leaves; sepals whitish, finely scarious, recurved; petals 7-9, narrow-oblong, tapering toward base, 1-2 mm broad and to 9-12 mm long; fruitlets obvate-oblong, laterally compressed, narrowed toward apex, with an obtuse beak, glabrous. May.

Subalpine zone, among stones and thawing snows, at 2,000-3,000 m. - Caucasus: S. and E. Transc. (rare). **Gen. distr.:** Bal.-As. Min. Described from Greece. Type in Paris.

Genus 536. BATRACHIUM * S. F. GRAY**

S.F.Gray Nat. Arr. brit. pl. (1821) 720.

Flowers solitary, white with a yellow claw; nectar-pit at base of petal open, without scales; pedicels long; leaves opposite or terminal, straight initially, reflexed in fruit; fruitlets without margin, transverse-rugose. Aquatic plants with leaves floating and submerged or only submerged leaves various: either all filiform, with many veins, or the lower (submerged) filiform-multipartite and the upper (floating) lobate or dissected into more or less broad lobes of varying shape, petiolate or sessile, with spurious apically auriculate amplexicaul sheaths. Russian names: Shelkovnik, vodyanoi lyutik [aquatic crowfoot].

336 Note 1. The preparation of much material in the USSR displays inadequacy and indefiniteness of such generally accepted characters as the number of stamens, their dimensions in relation to the fruiting head, number of nerves in petals, size relationships between pedicels and leaves and between leaves and internodes, the shape of the rip receptacle, etc. Moreover, abundant material indicates the importance of such generally disregarded characters as type and degree of leaf dissection, size ratio between their parts (segments), presence of petioles, leaf color, and varying thickness of the lobes involving a greater or lesser degree of collapse of the leaves out of water, etc. Dimensions of the flowers and their parts and the number and dimensions of the fruitlets proved to be more or less constant.

Note 2. Reliable determinations of *Batrachium* require the collection, at a single locality, of specimens at various stages of development, since several species change considerably in outward appearance in the course of their vegetative period. In any case, it is necessary to obtain entire plants, as the basal leaves often differ in shape from the upper leaves. In all stages of development there are produced highly variable terrestrial fleshy forms (*formae succulentae*) which do not lend themselves to classification unless normally developed specimens are simultaneously collected from the same water body. It is always necessary to determine which forms develop floating leaves, the stage at which this occurs and when it ceases, and if both transitional and normal floating leaves or only one or the other type are produced. Moreover, it is extremely important to know whether the plant lives in fresh, brackish or salt water. It is essential to collect flowering specimens with intact sepals and a sufficient quantity of mature fruits (see A. N. Petunnikov, Tr. Yur. Bot. Sada, I (1900) 33-34).

* From the Greek *batrachion*, a plant name used by Hippocrates.

** Treatment by V. I. Krechetovich.

1. Plants with quite distinct floating and submerged leaves 2.
- + Plants with leaves of one kind all submerged 6.
2. Submerged leaves long-petioled, more than 4 cm long, 6-7 times
4-5-partite, with unequal lateral parts and additional ramifications;
flowers 20-30 mm in diameter; stems inflated (to 5 mm thick), more
or less branched above 3.
- + Submerged leaves short, to 3 cm long, subsessile, uniformly 4-5
times tripartite, the middle part as long as or shorter than the lateral
parts; flowers 10-15 mm in diameter; stems more or less slender
(1-2 mm thick), unbranched or branching in lower parts 4.
3. Submerged leaves with short and dense divaricate rigid lobes,
(3)4-6 cm long (Plate XXII, Figure 6) 12. *B. bichotomum* Schmalh.
- + Submerged leaves with very long racemiformly clustered scarcely
crisp and soft lobes, to 15-20 cm long 13. *B. langei* F. Schultz.
4. Submerged leaves dark green, rigidulous and divaricate, with shorter
middle part and strongly developed leaf sheath; leaves, sheaths, and
fruitlets more or less hairy; floating leaves rounded-peltate, their
lobes cuneate-triangular, not overlapping. European part of the USSR.
(Plate XXII, Figures 1 and 11) 8. *B. giliberti* V. Krecz.
- + Submerged leaves light green, soft, with equal parts, without any
perceptible basal sheath. Plants glabrous; fruitlets glabrous or
scarcely setose; floating leaves reniform, semiorbicular, their lobes
broad-ovate or ovate-cuneate, overlapping 5.
5. Plants with long internodes (5-8 times as long as leaves); floating
leaves with broad-ovate semiorbicular lobes (Plate XXII, Figures 3
and 12); transitional leaves absent; submerged leaves 2-2.5 cm
long; flowers 12-15 mm in diameter (Altai, Sayans)
. 14. *B. mongolicum* (Kryl.) V. Krecz.
- + Plants with short internodes (as long or twice as long as leaves);
floating leaves with broadly ovate-triangular and broadly cuneate
lobes, with transitional submerged leaves with narrowly dissected
lobes; submerged leaves 3-3.5(4) cm long; flowers 8-19 mm in
diameter. (Caucasus) 4. *B. triphyllum* (Wallr.) Dum.
- 6(1). Fruitlets 50-80 per head 7.
- + Fruitlets not more than 25-30 per head 8.
7. Fruitlets scarcely 1-1.2 mm long, suborbicular; flowers 6-8 mm in
diameter. Small slender plants with leaves 2-2.5 cm long, more or
less crisp above the water (Plate XXI, Figure 6)
. 9. *B. rionii* (Lagg.) Nym.
- + Fruitlets 1.5-1.6 mm long, ovate; flowers 10-12 mm in diameter.
Large thick-stemmed plants with 4-6 cm long leaves more or less
racemiformly collapsing when out of water
. 10. *B. pachycaulon* Nevski.
8. Plants with amplexicaul orbicular sessile divaricate repeatedly
tripartite leaves 1-2 cm in diameter, perpendicular to stem; inter-
nodes many times as long as leaves (Plate XXI, Figure 4); flowers
15-18 mm in diameter, on very long pedicels
. 1. *B. foeniculaceum* (Gilib.) V. Krecz.
- + Plants with semiorbicular sessile or petiolate leaves, 3-4 or more
times tripartite, longer leaves set at an angle to the stem, if leaves
sometimes little divided then the flowers scarcely 5-8 mm in
diameter 9.

9. Seashore plants with very long (to 15–20 cm) more or less inflated internodes and with shortish (to 5–6 cm) leaves not collapsing out of water; flowers 16–20 mm in diameter, with numerous stamens (20–25). Baltic coast 11. *B. marinum* (Arrh. et Fr.) Fr.
 + Freshwater plants with short noninflated internodes; flowers not more than 10–12(15) mm in diameter; stamens 8–15 10.
 338 10. Plants with long (to 6–10 cm) dark, 4–5 times tripartite petiolate leaves, strongly collapsing out of water (Plate XXI, Figure 5) 5. *B. kauffmannii* (Clerc. V. Krecz.
 + Plants with shorter (2–5 cm) 2–4 times tripartite leaves, divaricate or only partially collapsing out of water 11.
 11. Plants slender and delicate, light green, with thin petiolate 2–3 times tripartite leaves diverging or more or less collapsing out of water, their middle part as long as their lateral parts; flowers 6–8(10) mm in diameter 12.
 + Plants rigidulous and fragile, dark green, with sessile 3–4 times tripartite leaves, the leaves crisp-divaricate, not collapsing, their middle part shorter than their lateral parts; flowers 10–15 mm in diameter 13.
 12. Small plants with scarcely repeatedly tripartite leaves not more than 2–3 cm in diameter, more or less divaricate when out of water; flowers 6–8 mm in diameter; fruitlets 8–15 2. *B. eradicatum* (Laest.) Fr.
 + Larger plants with 3 times tripartite leaves, 3–4.5 cm long partially collapsing out of water; flowers 8–10 mm in diameter; fruitlets more numerous (to 20) 3. *B. divaricatum* (Schrank) Schur.
 13. Leaves rigid, black-green, crisp-divaricate, semiorbicular, 3 times tripartite, 3–5 cm long; flowers 12–15 mm in diameter; fruitlets, leaves, leaf sheaths, and upper part of plant usually more or less hairy; stems firm 7. *B. trichophyllum* (Chaix) van der Bossche.
 + Leaves less rigid, green, partially collapsing out of water or else not collapsing, semicircularly flabellate, 4–6 times tripartite, 4–7 cm long; flowers 15–18 mm in diameter; entire plant glabrous; stems more or less thickened and inflated 6. *B. carinatum* Schur.

Series 1. *Circinata* V. Krecz. — Rigidulous plants with short amplexicaul leaves perpendicular to the stem; internodes long. Flowers 15–18 mm in diameter; stamens up to 20.

1. *B. foeniculaceum* (Gilib.) V. Krecz., comb. nov. — *B. divaricatum* Wimm., Fl. Schles. (1841) 10, non Schur. — *B. circinatum* Fr. Nov., Fl. Suec. Mant. III (1842) 52. — *Ranunculus foeniculaceus* Gilib., Fl. lithuan. V (1782) 261; Exerc. phyt. I (1792) 970. — *R. circinatus* Sibth., Fl. Oxon. (1794) 175; Maevsk., Fl. Sr. Ross., ed. 6 (1933) 343, fig. 134. — *R. divaricatus* Ldb., Fl. Ross. I (1842) 28; Shmal'g., Fl. Yugo-Zap. Ross. (1886) 10, non Schrk. — Ic.: Syr., Ill. Fl. Mosk. gub. II (1907) 155. — Exs.: Dörlf. No. 4454; Pl. Pol. exs. No. 606, 903; HFR No. 252.

Perennial; stems glabrous, with long internodes many times as long as the leaves; leaves sessile, amplexicaul, orbicular, (0.5)0.8–2 cm long, perpendicular to the stem, repeatedly tripartite, with short distant somewhat curved setiform-linear obtuse lobes, the middle part of leaf blade as long as the lateral parts (Plate XXII, Figure 4); pedicels many times as long as the leaves; flowers 15–18 mm in diameter; petals broad-obovate and obovate; stamens 15–21; in fruit, receptacle globose, setose; fruitlets asymmetrically obovate, slightly setose above, the broad stigmas with clavate papillae. Mid-June through August. (Plate XXI, Figure 1).

Slow-flowing river waters, ponds, oxbows, etc. — European part: (except Kar.-Lap., northern Dv.-Pech., and northern Crimea); W. Siberia: all regions; E. Siberia: all regions— Centr. Asia: Ar.-Casp., Balk. **Gen. distr.:** Atl. and Centr. Eur., N. Mong. Described from Grodno, Lithuania. Type in Kiev (?).

Note. The Siberian plants differ in habit from the European: they are recorded as *R. circinatus* var. *tenuissimus* Freyn in Oesterr. Bot. Zeitschr., 1901, 378, and more or less constitute here and in the southeast of the European part of the USSR a distinct Siberian variety [sic.]. They have more delicate leaves with thinner longer lobes, hairy sheaths, and smaller (?) flowers.

Series 2. **Flaccida** V. Krecz. — Slender light green plants with thin 2–3 times tripartite petiolate leaves with equal parts. Flowers 6–8(10) mm in diameter; stamens 8–15.

2. **B. eradicatum** (Laest.) Fr. in Bot. Notis. (1843) 114. — *B. confervoides* Fr. in Bot. Notis. (1845) 121. — *B. admixtum* Nyl. ex Nyl. et Sael., Herb. Mus. Fen. (1859) 35 (in nota). — *Ranunculus confervoides* Fr., Summa veg. Scand. I (1846) 139; Kryl., Fl. Zap. Sib. V, 1181; Maevsk., Fl. Sr. Ross., ed. 6 (1933) 343. — *R. aquatilis* var. *eradicatus* Laest. in Nov. act. Soc. Ups. XI (1839) 242 (in nota). — *R. aquatilis* γ *sajanensis* Rgl. et Radde in Bull. Soc. I (1842) 27, exp. — Ic.: Syr., Ill. Fl. Mosk. gub. II (1907) 155. — Exs.: Pl. Finl. exs., No. 659; Dörf., No. 3001.

Perennial small delicate plants, the slender stems aphyllous below; leaves shorter than or as long as internodes, short-petioled, flabellately semiorbicular in outline, repeatedly (rarely 3 times) tripartite, with few piliform lobes divergent or partially collapsing out of water, the middle part of the leaf blade as long as the lateral parts (Plate XXII, Figure 5); pedicels 2–3 times as long as the leaves; flowers 6–8 mm in diameter; petals cuneate-obovate, twice as long as the curved sepals; stamens (5)8–(–10); in fruit receptacle conical-cylindric, setose; fruitlets 8–15, oblique, ellipsoid-reniform, 1.7–1.8 mm long, glabrate, the slender curved lateral style with cylindric papillae. May–July. (Plate XXI, Figure 2).

Rivers, rivulets, and lakes (in flowing water). — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V. (Yaroslavl' area: Vargovo Bog near Pershino; Dymovka, Kashin District), V.-Kama (Polazna on the Kama River); W. Siberia: Ob, Alt., Irt.; E. Siberia: Yenisei, Ang.-Say., Dau.; Far East: Ze.-Bu., Uss. (?). **Gen. distr.:** Centr. Eur., Scand., Greenland. Described from Sweden: Karesuando (Karavuopio and Saksajavre. Type in Uppsala (?).

Note. The East Siberian plants differ from the boreal-European in that their longer leaf parts reach 3–3.5 cm or more, the larger flowers (to 10 mm in diameter), with petals twice as long as sepals; they somewhat resemble the species which follow but are distinguished from them by their slightly repeatedly divided leaves with very long petioles. In East Siberia this species seems to form a separate variety appropriately called *B. sajanense* (Rgl. et Radde) V. Krecz.

3. *B. divaricatum* (Schrank) Schur, En. pl. Trans. (1866) 12, non Wimm. — *B. paucistamineum* F. Schultz, Arch. Fl. Fr. et All. (1844) 71. — *B. drouetii* Nym. in Bot. Notis. (1852) 98. — *B. flaccidum* Rupr. in Mém. Ac. St. Petersb., VII sér., XV (1869) 115; Grossg., Fl. Kavk. II, 109. — *B. aquatile* ssp. *heleophyllum* Grossh., l.c. — *Ranunculus divaricatus* Schrank, Baier. Fl. II (1789) 104; Williams in Journ. of Bot. XLVI (1908) 20, non Koch nec Ldb. nec alii. — *R. paucistamineus* Tausch in Flora XVII (1834) 525, non Freyn. — *R. paucistamineus* var. *drouetii* Gelert in Bot. Tidsskr. XIX (1894) 28. — *R. drouetii* F. Schultz ex Gr. et Godr., Fl. Fr. I (1847) 124; N. Busch in Fl. cauc. crit. III, 3, 129, ex p. — *R. flaccidus* auct. Fl. Ross. — *R. aquatilis* β *pantothrix* Ldb., Fl. Ross I (1842) 27, pro max. p. — *R. aquatilis* c. *drouetii* Schmalh., Fl. Yugo-Zap. Ross. (1886) 10. — Exs.: Pl. Finl. exs. No. 655.

Perennial, light green, with slender glabrous stems; leaves light green, thin, petiolate, flabellate-flagelliform in outline, 3–4 cm long, 3 (rarely more) times tripartite, with piliform lobes adhering or scarcely adhering when out of water, the middle part of the leaf blade as long as the lateral parts (Plate XXII, Figure 9); pedicels scarcely longer than the leaves; flowers 8–10(12) mm in diameter; petals narrowly obovate, almost twice as long as sepals, readily deciduous; stamens (5)9–13; fruitlets 15–20, grayish, slightly setose above; stigmas with cylindric papillae. June–September. (Plate XXI, Figure 3).

343 Standing water and slow-flowing rivers. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V. (Yaroslavl', Tver' [now Kalinin], Vladimir, and Moscow areas), V.-Kama; Caucasus: all regions; W. Siberia: Ob. Alt., Irt.; E. Siberia: Yenisei (N.), Ang.-Say.; Centr. Asia: Pam.-Al., T. Sh. Gen. distr.: W. Eur. (as far north as 70°50'N), N. Am. Described from Bavaria.

Note. The Central Asian plants with their isolated distribution area apparently constitute a separate variety, with larger broad-petaled flowers and more rigid leaves. The Shugnan plants are distinguished by their smaller dimensions and the clusters of nonevolute leaves.

4. *B. triphyllum* (Wallr.) Dum. in Bull. Soc. Bot. Belg. II (1863) 214. — *B. aquatile* Rupr. in Mém. Ac. St. Pétersb. VII sér., XV, 2 (1869) 15. — *B. aquatile* ssp. *heterophyllum* Grossh., Fl. Kavk. II (1930) 109. — *Ranunculus triphyllus* Wallr. in Linnaea XIV (1840) 584. — *R. aquatilis* C.A.M., Verz. Pflz. Cauc. (1831) 202. — *R. aquatilis* subsp. *heterophyllum* N. Busch in Fl. cauc. crit. III (1903) 127.

Perennial, frequently with transitional forms between the floating and the submerged leaves; floating leaves suborbicular-reniform, broadly cordate,

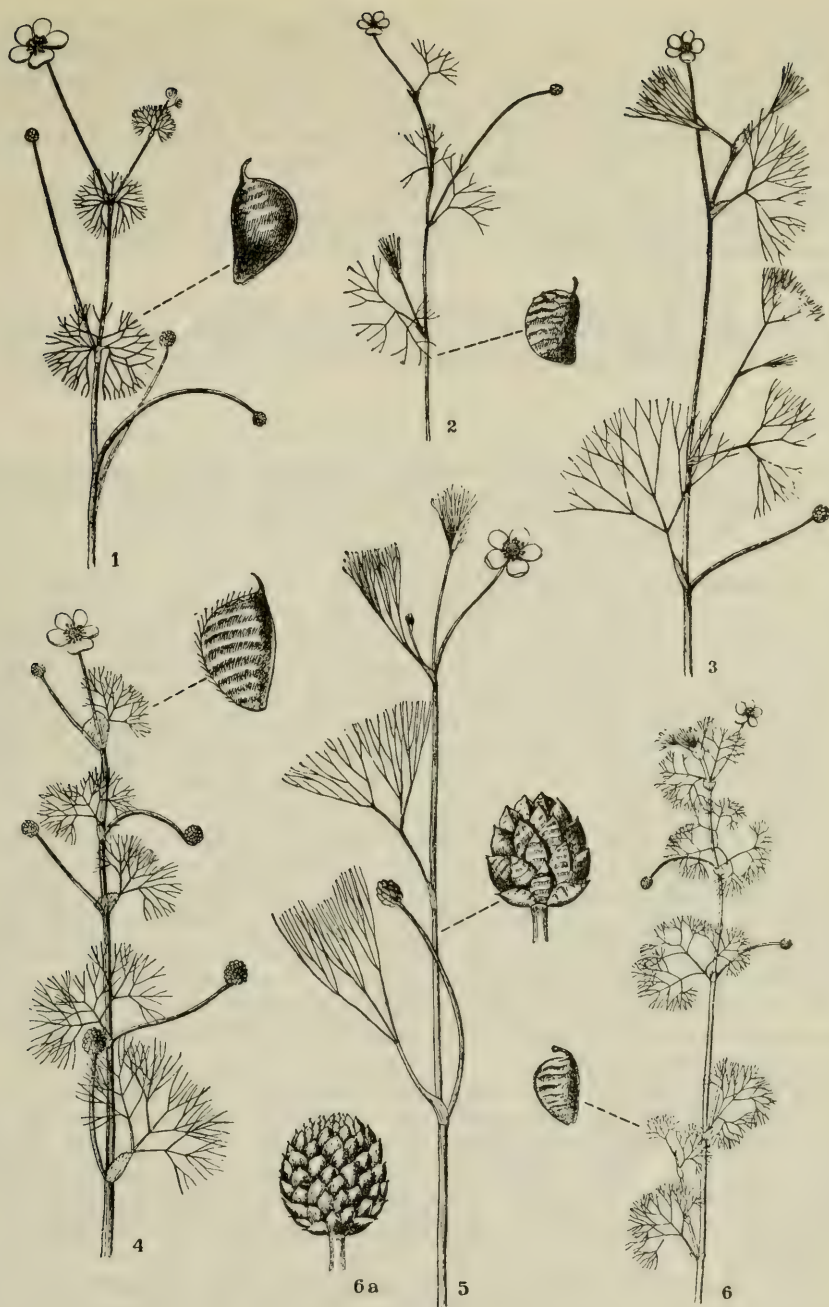


PLATE XXI. 1—*Batrachium foeniculaceum* (Gilib.) V.Krecz.; 2—*B. eradicatum* (Laest.) Fr.; 3—*B. divaricatum* (Schränk) Schur.; 4—*B. trichophyllum* (Chaix) van d. Bossche; 5—*B. kauffmanni* (Clerc) V.Krecz.; 6—*B. rionii* (Lagg.) Nym.

1.5–2.5 cm in diameter, 3–5-partite almost to base, their lobes broadly obovate or broadly triangular, shallowly 3–5-incised into broad obtuse teeth; leaves following the upper leaves [sic.] more deeply incised and with narrower cuneate lobes; submerged leaves petiolate, when out of water divergent like those of the preceding species; flowers and fruits resembling those of the preceding species. May–August.

Backwaters, ditches, and small lakes. — Caucasus: Cisc. (Kuban, Digoriya, Chechiya), Dag., E. Transc. (Kuba District). Gen. distr.: Atl. and Centr. Eur., Med., As. Min. Described from the Karz Mountains in Germany.

Note. This appears to be a heterophyllous variety of *B. divaricatum* Schur, whereas *B. heterophyllum* Fr., in its strict original sense, recorded for the Caucasus, is none other than *B. peltatum* (Schränk) Presl.

Series 3. *Carinata* V. Krecz. — Plants with dark crisp repeatedly (4–6 times) tripartite sessile leaves with unequal parts. Flowers 12–18 mm in diameter; stamens (10)12–17.

5. *B. kauffmannii* (Clerc) V. Krecz., comb. nova. — *B. trichophyllum* Kom. et Aliss., Opred. rast. Dal'nevost. kr. I (1931) 553, ex p., non van den Bossche. — *Ranunculus kauffmannii* Clerc in Bull. Soc. Oural. Amat. Sc. Nat. IV (1878) 107. — *R. pseudoflaccidus* Petunn. ex Syr., Ill. Fl. Mosk. gub. II (1907) 153, in nota, cum tab. — *R. carinatus* var. *kauffmannii* Petunn., ib., IV (1914) 79; Kryl., Fl. Zap. Siv. V, 1181; Maevsk., Fl. Sr. Ross., ed. 6 (1933) 343. — *R. fluitans* Kauffm., Moskov. Fl. (1866) 27 non Lam. — *R. paucistamineus* Korsh., Tent. fl. or. 344 (1898) 77, non Tausch. — Ic.: Syreishch., l.c., p. 153.

Perennial, with glabrous, nonthickened stems; leaves long, petiolate, flabellate-flagelliform (Plate XXII, Figure 7), strongly racemiformly adhering when out of water, (6)7–10 cm long, repeatedly (up to 4–5 times) tripartite (bipartite only at the tips) with delicate piliform lobes, the inner part of the leaf blade considerably shorter than the lateral parts; pedicels longer than or as long as the leaves; flowers 12–15 mm in diameter; petals obovate, twice as long as the curved sepals; stamens (10)12; fruitlets up to 30, asymmetrically elliptic, 2 mm long, glabrous or somewhat setose; stigmas with cylindric papillae. May–August. (Plate XXI, Figure 5).

Slow-flowing waters. — European part: Kar.-Lap. (S.), Lad.-Ilm., Dv.-Pech. (to 65°N), U. Dnp. (Dnieper River and to the east of it), M. Dnp. (E.), U. V., V.-Don, V.-Kama, Transv.; W. Siberia: Ob, Irt., Alt.; E. Siberia: Yenisei, Ang.-Say., Dau.; Far East: Ze.-Bu., Uda, Uss., Sakh., Kamch. Gen. distr.: Scand., N. Mong. Described from the vicinity of the Arkhangelo-Pashiiskii Zavod in the former Perm Province. Type in Moscow (?).

Note. The Kamchatkan plants are distinguished by larger leaves and flowers (to 20 mm in diameter). Together with the Far Eastern plants, they may well constitute a separate variety.

6. *B. carinatum* Schur in Verh. Naturf. Ver. Bruenn. XV, 2 (1877) 28. — *Ranunculus carinatus* Freyn ex Kern., Sched. Fl. Exs. Austro-Hung. I (1881) 21. — Ic.: Syr., Ill. Fl. Mosk. gub. IV (1914) 79. — Exs.: Fl. exs. Austr.-Hung. No. 96.

Perennial, with glabrous thickened stems; leaves sessile or subsessile, semiorbicular-flabellate in outline, 4–7 cm long, with thin more or less crisp lobes not collapsing or scarcely collapsing out of water, 5–6 times tripartite, the inner part of the leaf blade shorter than the lateral parts; pedicels twice as long as the leaves; flowers 15–18 mm in diameter; petals obovate, twice as long as sepals; stamens 14–18; fruitlets up to 30, asymmetrically elliptic. May–August.

Rivers and canals. — European part: U. Dnp., M. Dnp. Gen. distr.: Centr. Eur. Described from the vicinity of Vienna. Type in Vienna.

Series 4. **Paucistaminea** V. Krecz. — Fragile pubescent plants with crisp, 3 times tripartite dark green sessile leaves. Flowers 12–15 mm in diameter; stamens 10–15.

7. **B. trichophyllum** (Chaix) van den Bossche, Prodr. fl. Bat. (1850) 7. — *Ranunculus trichophyllus* Chaix ex Vill., Hist. pl. Dauph. I (1786) 335 (nomen); Godr. ex Gr. et Godr., Fl. Fr. I (1847) 23; Williams in Journ. of Bot. XLVI (1908) 48. — *R. paucistamineus* Freyn ex Kern. Sched., Fl. Exs. Austr.-Hung. I (1881) 20. — *R. paucistamineus* var. *divaricatus* Gelert in Bot. Tidsskr. XIX (1894) 27. — *R. aquatilis* d. *trichophyllus* Schmalh., Fl. Yugo-Zap. Ross. (1886) 10.

Perennial, dark green, usually hairy above; leaves sessile, rigidulous, dark green, semiorbicular in outline, 3–5 cm long, usually 3 times tripartite, their lobes crisp, divaricate out of water, with broad pilose spurious basal sheaths, the middle part of the leaf blade shorter than the lateral parts (Plate XXII, Figure 8); pedicels usually not longer or scarcely longer than leaves; flowers 12–15 mm in diameter; petals cuneate-obovate, somewhat curved, 1.5–2 times as long as the very late-deciduous sepals; stamens 8–15; fruitlets 25–30, green, usually strongly hispid; stigmas with oval papillae. June–August. (Plate XXI, Figure 4).

Rivers. — European part: Kar.-Lap. (Petrozavodsk area), Lad.-Ilm., Dz.-Pech. (Khavrogory in the Kholmogory District), U. Dnp., U. V., V.-Kama, M. Dnp., V.-Don, Bl., L. Don, Crim; Caucasus: Cisc. (W.) W. Transc.; W. Siberia: Ob, Alt.; E. Siberia: Yenis., Lena-Kol.; Far East: Uss., Uda, Sakh., Kamch. Gen. distr.: Atl. and Centr. Eur., N. Am. Described from Dauphiné (Valgau and Dévoluy), France.

8. **B. giliberti** V. Krecz., nomen novum. — *B. radians* Rev. in Ac. Linn. Soc. Bord. XIX (1853) 120, non Dum. — *Ranunculus diversifolius* Gilib., Fl. lith. V (1782) 262, non Schrank, nec. aliorum. — *R. heterophyllus* Jundz., Opis. rosl. Litew. (1791) 170, non Fr., nec. aliorum. — *R. paucistamineus* var. *heterophyllus* Freyn ex Kern., Sched. Fl. Exs. Austr.-Hung. IV (1886) 37. — *R. aquatilis* var. *heterophyllus* Ldb., Fl. Ross. I (1842) 27, exp. — *R. aquatilis* c. *triphyllus* Schmalh., Fl. Yugo-Zap. Ross. (1886) 9. — Exs.: Fl. exs. Austr.-Hung., No. 1705; Pl. Pol. exs. No. 302.

Perennial, more or less pubescent, with floating and submerged leaves linked by transitional forms; floating leaves rounded-peltate, 1.5–2 cm in diameter, 3–5-partite to base, with cuneate-triangular more or less

strongly incised lobes, their teeth subobtuse or subacute and not broad; the next to lowest leaves usually tripartite, all with more or less narrow and increasingly incised lobes, gradually passing into filiformly dissected divaricate submerged leaves resembling those of the preceding species. Other characters also as in the preceding species. May–August. (Plate XXII, Figures 1 and 11).

Bogs, lakes, canals, and slow-flowing rivers. — European part: Lad.-Ilm., U. Dnp., M. Dnp., Bl., V.-Don (Mozharovo, Kirsanov District). **Gen. distr.:** Centr. Eur. Described from Lithuania: Ezery, Grodno District. Type in Kiev (?).

Note. This species undoubtedly represents a heterophyllous variety of the preceding species; it does not extend far to the east.

346 Series 5. **Polysperma** V. Krecz. — Plants with very numerous (45–80) and smaller achenes.

9. **B. rionii** (Lagg.) Nym., Syll. fl. Eur. (1854–1855) 174; Grossg., Fl. Kavk. II, 109. — **B. caespitosum** Grossh., l.c., pro max. p. — **B. flaccidum** var. **parviflorum** C.A.M. in Beitr. Pflzk. Russ. Reich. VII (1849) 55, exp. — **Ranunculus rionii** Lagg. in Flora XXXI, 1 (1848) 49. — **R. drouetii** N. Busch. in Fl. cauc. crit. III, 129 (1903) exp., non F. Schultz. — **R. trichophyllus** N. Busch., l.c., 128, exp., non Chaix. — Ic.: Hegi, Ill. Fl. Mitt. Eur. III, fig. 708, f-i.

Perennial, small, slender, resilient plants; leaves short-petioled, in upper part subsessile, 2–3 times tripartite, broadly suborbicular in outline, 2–2.5(3) cm long, with thin somewhat crisp lobes not collapsing or scarcely collapsing out of water, the middle part of the leaf blade shorter than the lateral parts (Plate XXI, Figure 6); pedicels many times as long as leaves; flowers 6–8 mm in diameter; petals obovate; stamens 6–16; fruitlets small, scarcely 1–1.2 mm long, suborbicular, glabrate or glabrous, numerous (up to 80), crowded. April–August.

Shallow standing and solonchak bodies of water and lakes. — European part: Bl., L. Don, L. V., Transv., Crim.; Caucasus: throughout; W. Siberia: Ob (southern border with the Ishim and Tyukalinsk districts), U. Tob., Irt., Alt.; Centr. Asia: Ar.-Casp., Balkh., Kara K., Amu D., Syr. D., Mtn. Turkm., T. Sh. **Gen. distr.:** Centr. Eur., Bal.-As. Min., Iran. Described from Switzerland: Sion and Valais. Type in Freiburg.

10. **B. pachycaulon** Nevski in Acta Inst. Bot. Ac. Sc. URSS ser. 3, IV (1937). — **Ranunculus aquatilis** B. Fedtsch., Rast. Turk. (1915) 416, exp. — **R. aquatilis** var. **pantothrix** B. Fedtsch. in A. H. P. XXI, 3 (1903) 247. —

Perennial, with thickened (to 2 mm) pale stems; leaves flabellate-flagelliform, petiolate, 4–6 cm long, with thickened petioles, shorter than or as long as the internodes, 4–5 times tripartite, with piliform lobes more or less collapsing out of water, the middle part of the leaf blade about as long as the lateral parts; pedicels longer than leaves; flowers (8)–10–12 mm in diameter; petals broad-obovate, twice as long as sepals; stamens 16–20; in fruit receptacle slightly setose, oblong; fruitlets



PLATE XXII. 1, 11 — *Batrachium giliberti* V.Krecz.; 2, 6, 10 — *B. dichotomum* Schmalh.; 4 — *B. foeniculaceum* (Gilib.) V.Krecz.; 3, 12 — *B. mongolicum* (Kryl.) V.Krecz.; 5 — *B. eradicatum* (Laest.) Fr.; 7 — *B. kauffmannii* (Clerc) V.Krecz.; 8 — *B. trichophyllum* (Chaix) van d. Bossche.; 9 — *B. divaricatum* (Schränk) Schur.

numerous (50–65), asymmetrically ovate, 1.5–1.6 mm long, glabrous, with a short lateral style. April–July.

349 Bodies of spring water and irrigation ditches. — Centr. Asia: Ar.-Casp. (Mangyshlak, Mt. Ak.-tau, Dzgharmush Spring), Kara K., Mtn. Turkm., Amu D., Syr D. **Gen. distr.:** Iran. Described from Kugitang (source of the Kara-su River, near the village of Kugitang). Type in Leningrad.

Series 6. *Litoralia* V.Krecz. — Seashore plants with long internodes and inflated stems; flowers 10–20 mm in diameter; stamens 20–25.

11. *B. marinum* (Arrh. et Fr.) Fr., Nov. fl. Suec. Mant. III (1842) 51. — *B. fluitans* f. *marinum* Gelert in Bot. Tidsskr. XIX (1894) 23. — *Ranunculus marinus* Arrh. et Fr., Mant. III (1842) 52. — *R. aquatilis* var. *baudotii* Schmalh., Fl. I (1895) 16. — *R. baudotii* var. *submersus* Litw. in Sched. HFR II (1900) 46. — Exs.: Dörfl., No. 4810; HFR No. 351.

Perennial, with long inflated thickened (to 3–4 mm) pale stems, aphyllous below, with very long internodes, to 12–20 cm (or even longer); leaves one-third to half as long as internodes, sessile, 5–6 cm long, 2–3 times tri- and bipartite, flagelliform; toward base of stem leaves less dissected; leaf lobes numerous, not collapsing out of water; pedicels several times as long as leaves; flowers 10–20 cm in diameter; petals broad-obovate, 2–3 times as long as sepals; stamens 20–25; fruitlets 12–20, 2–2.2 mm long, in a large head, glabrous, obovate, with an oblique stigma. May–August.

Seashores. — European part: Dv.-Pech. (?): between Uima and Lyavlya (Boguslavskii), Lad.-Ilm. (Baltic coast). **Gen. distr.:** Scand., Atl. Eur. Described from Sweden: Baltic coast near Ronneby. Type in Uppsala.

Series 7. *Peltata* V.Krecz. — Plants usually heterophyllous; floating leaves reniform, broadly and shallowly 3–5-partite.

12. *B. dichotomum* Schmalh. in Trav. Soc. Nat. St. Petersb. V, 2 (1874) XVIII; Trautv. in A.H.P. IX (1884) 363. — *R. aquatilis* var. *dichotomus* Schmalh., l.c. — *R. peltatus* ssp. *septentrionalis* Lindb., f. ex Hjelt in Act. Soc. pro F. et Fl. Fen. XXX, 1 (1906) 228. — Exs.: Pl. Finl. exs. No. 657.

350 Perennial, the long stems inflated-thickened above, dichotomously branching, with elongated internodes; leaves polymorphous (rarely only submerged leaves formed); floating leaves reniform, 1 cm long, 2 cm broad, shallowly 3–5-partite, with semiorbicular obtuse lobes (rarely 5-fid, with repeatedly shallowly parted lobes and then rounded-peltate); sometimes intermediate leaves present with fimbriately incised lobes; submerged leaves long-petioled, irregularly 6–7 times 3–5-partite, with rigid divaricate entangled crisp lobes, 3–6 cm long; pedicels twice as long as leaves, strongly inflated; flowers 20–25 mm in diameter; petals obovate, 2–3 times as long as sepals; stamens 20–25; fruitlets 15–20, semiorbicular-ovate, with setose margins. April–July. (Plate XXII, Figures 2, 6, 10).

Sluggish water. — European Part: Kar.-Lap., Dv.-Pech. (W.), Lad.-Ilm. (N.). **Gen. distr.:** Scand. Described from Lakes Glubokoe and

Kopenskoe in [the former] Yamburg County [Leningrad Region]. Type in Leningrad.

Note. This species constitutes a boreal race of the European *B. heterophyllum* (Web.) Lange = *B. peltatum* (Schrank) Presl, which is distinguished by its more delicate stem and by the more nearly equilateral and less (3-4 times) dissected submerged leaves.

13. *B. langei* F. Schultz ex Nym., Syll. fl. Eur. (1854-1855) 16.

Perennial, distinguished from *B. dichotomum* Schmalh. (which it resembles in its repeatedly and irregularly divided submerged leaves and in the shape of its floating leaves) mainly by the long (to 15-20 cm) 5-6 times tripartite leaves with very long scarcely crisp or soft lobes, racemiformly or racemiformly-flabellately arranged; flowers 2.5-3 cm in diameter.

European part: Lad.-Ilm.: Neva River mouths, Bab'ya River; Lodeinoo Pole (Kamenka River). Gen. distr.: Scand., Centr. Eur. Described from Denmark.

Note. The USSR plants are distinguished from the authentic *B. langei* F. Schultz mainly by their very strong development. I have been guided by the findings of A. Petunnikov.

14. *S. mongolicum* (Kryl.) V. Krecz., comb. nova. - *Ranunculus aquatilis* ssp. *mongolicus* Kryl., Fl. Zap. Sib. V (1931) 1180. - *R. aquatilis* var. *heterophyllum* C.A.M. in Ldb., Fl. Alt. II (1830) 334; Ldb., Fl. Ross. I, 27 ex p.

Perennial, with more or less slender pale stems and long internodes; leaves polymorphous; the upper floating, rounded-reniform, deeply cordate, 1-2 cm in diameter, 3-5-partite to two-thirds, their lobes broad-ovate, with 2-3 broad subacute or obtuse teeth, rarely entire; submerged leaves short-petioled, orbicular, 3-4 times tripartite with filiform lobes diverging when out of water, 2-2.5 cm in diameter; pedicels longer than leaves; flowers 12-15 mm in diameter, with obovate petals twice as long as sepals; stamens 12-15; in fruit receptacle orbicular, hairy; fruitlets with a lateral style, 1.8 mm long, setulose above. (Plate XXII, Figures 3 and 12).

Lakes. - W. Siberia: Alt.; E. Siberia: Ang.-Say. Gen. distr.: N. Mong. Described from Altai. Type in Tomsk.

351 Genus 537. **RANUNCULUS** * L.**

L. Syst. ed. 1 (1735); L. Sp. pl. (1753) 584 ex pte. - *Hecatonia* Lour. Fl. cochinch. (1790) 302. - *Pachyloma* Spach, Hist. Veg. VII (1839) 194. - *Pfundia* Opiz, Seznam (1852) 73 (nomen). - *Xiphocoma* Stev. Bull. Soc. Nat. Mosc. XXV (1852) 537.

Perianth double; sepals 5, rarely 3 or 4; inner whorl of 5 petaloid nectaries, rarely more or less, occasionally undeveloped or obsolete and then (subgenus *Micranthus* shorter than the colored segments of the outer envelope; nectaries (petals) with proximal nectar pit, glabrous or covered with scales; styles and stamens numerous (rarely 4-10 stamens), spirally arranged in several rows; fruitlets 1-seeded dry nutlets forming

* A diminutive of *rana*, a frog, a plant name used by Pliny.

** Treatment by P.N. Ovchinnikov.

a more or less compact head. Annual or perennial herbaceous plants, usually with palmatipartite or pinnatipartite or entire leaves, with a bundle of slender root fibers, a developed rootstock or numerous tuberously thickened fascicular roots (subgenus *Ranunculastrum*); flowers solitary or in a cymose inflorescence.

A large genus, with approximately 600 species widely distributed throughout the world; 160 species are represented in the USSR. Species of *Ranunculus* inhabit all zones from the Arctic tundra to deserts and alpine zones; they grow in flooded and boggy places, in forests and steppes, on dry slopes, among stones, and even on rocks. However, mesophyllous types predominate, even though *Ranunculus* is also known from desert areas, where they propagate under favorable damp conditions or in the damp spring season. Most species are poisonous. Russian name: lyutik.

Key to Subgenera and Sections

1. Fruitlets glabrous or hairy, flat or convex, without tuberculate
excrecences and spines 3.
- + Fruitlets laterally compressed, usually bearing tubercles or spines.
Annuals 2.
2. Flowers subsessile, to 2–3 mm in diameter, surrounded by small
bracts borne in axils of leaves; segments of outer envelope colored .
..... Subgenus 5. *Micranthus* Ovcz. (p. 363).
- + Flowers with long peduncles, considerably larger, without basal bracts;
outer envelope cup-shaped Subgenus 6. *Pachyloma* Spach (p. 364).
- 352 3. Fruitlets quite flat or strongly compressed laterally, often winged,
glabrous or hairy; roots dimorphic: some much thickened, elongated-
tuberous or torulose, others slender, fiberlike
..... Subgenus 7. *Ranunculastrum* Spach (p. 367).
- + Fruitlets convex or somewhat compressed laterally, very rarely quite
flat, winged; all roots fiberlike, slender, if dimorphic as in the
preceding species then the fruitlets orbicular, inflated, and the leaves
orbicular, entire; rootstock frequently developed 4.
4. Fruitlets inflated, transversely-rugose. Small plants with orbicular
entire leaves and thickened roots Subgenus 3. *Thora* DC. (p. 316).
- + Fruitlets more or less compressed laterally or convex, very rarely
quite flat, winged, lacking transverse wrinkles, roots fiberlike, slender,
or else rootstock developed 5.
5. Fruitlets large, to 5–8 mm long, oblong-elliptic, the lower seed-bearing
part inflated, the upper part somewhat compressed, full of loose white
tissue; sepals 3; petals 5–8 or more. Aquatic or palustrine plants
.. Subgenus 1. *Auricomus* Spach. Section 2. *Coptidium* Nym. (p. 278).
- + Fruitlets smaller [than 5–8 mm], or if large then more or less
orbicular, without differentiation into upper and lower parts. Aquatic,
palustrine, or terrestrial plants, sepals mostly 5, and if 3 sepals then
small and prostrate (Arctic) plant 6.
6. Aquatic floating or palustrine-terrestrial plants with creeping prostrate
stems rooting at the nodes; leaves strongly dissected or tridentate
or trilobate, the submerged leaves sometimes reduced to petioles;

fruitlets small, to 1–1.5 mm long, glabrous, smooth, somewhat inflated, with a very short beak; petals with a well developed claw; sepals and petals 3–5, subject to reduction Subgenus 1. **Auricomus** Spach. Section 1. **Xanthobatrachium** (Prantl) Ovcz. (p. 273). Terrestrial or palustrine plants; stems erect or ascending, if more or less prostrate then the leaves entire or lanceolate; sepals 5, petals 5 or more 7.

7. Stems prostrate, rooting at the nodes, mostly erect or ascending; leaves entire, elongate, ovate-lanceolate to linear Subgenus 1. **Auricomus** Spach., Section 3. **Flammula** Webb. (p. 279).

+ Stems erect or descending, not rooting at the nodes; leaves incised, parted, or compound 8.

8. Stigma sessile; fruitlets small, with obscure veins or transverse wrinkles, and an obsolescent beak; receptacle hollow as are the stems. Annuals or biennials of damp and boggy sites with small flowers and with upright stems Subgenus 2. **Hecatonia** (Spach) Ovcz. (p. 314).

+ Stigma with a style; fruitlets larger, with a developed beak; receptacle not hollow; flowers usually large 9.

9. Fruitlets inflated-convex, smooth, glabrous or pubescent, with one vein almost confluent with dorsal part, without or with an obscure scarious border; lower leaves usually less incised than the upper. Perennials, mostly with a bundle of slender fibrous roots Subgenus 1. **Auricomus** Spach. Section 4. **Euauricomus** Ovcz. (p. 284).

+ Fruitlets somewhat compressed laterally, glabrous, rarely hairy, bordered, with conspicuous longitudinal veins; lower leaves usually more divided than the upper; rootstock often developed Subgenus 4. **Chrysanthé** Spach (p. 316).

+ Fruitlets quite flat, winged; leaves tripartite with wide somewhat fleshy segments; rootstock developed, slender, with a row of thin root fibers. Glabrous plants from the alpine zone of the Pamir-Alai Range and the Hindu Kush Subgenus 4. **Chrysanthé** Spach. Section **Pachycarpus** Ovcz. (p. 363).

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Subgenus 1. **AURICOMUS** Spach, Hist. Veg. VII(1839)210.—Sect. **Hecatonia** DC., Prodr. I (1824) 30 ex pte.—Sect. **Marsypadenium** e. **Epirotes** Prantl in Engl. Bot. Jahrb. IX (1888) 266 ex pte; Ej. in Pflzfm. III, f. 2, 64.

Fruitlets smooth, glabrous or pubescent, with one vein almost confluent with inconspicuous dorsal keel, without a border or with a small obscure scarious border. Lower leaves usually less divided than the cauline leaves. Perennials, erect or ascending, terrestrial or aquatic-palustrine, prostrate, rarely with floating stems and leaves with a bundle of slender roots.

Section 1. **XANTHOBATRACHIUM** (Prantl) Ovcz.—Sect. **Hecatonia** DC., Prodr. I (1824) 30, 33 ex pte.: Ldb., Fl. Ross. I, 31.—Sect. **Marsypadenium** subsect. **Xanthobatrachium** Prantl in Engl. Bot. Jahrb. IX (1888) 266; Ej. in Engl. u. Prantl, Nat. Pflzfm. III, 2, p. 65.—Characters as in the key.

1. Aquatic plants with floating stems and leaves 2.
- + Terrestrial or palustrine plants, with erect or mostly prostrate stems
rooting at the nodes 5.
2. Leaves entire or 3-5-lobate-cleft, identical throughout stem 3.
- + Leaves submerged, deeply parted into filiform lobes or entire, filiform;
when present, floating leaves entire or 3-5-partite 4.
- 354 3. Leaf blade trilobate, with distant lateral lobes, thin, green, more or
less cuneate or rounded; receptacle oval-cylindric, glabrous; petals
and sepals mostly 3-4 . . . 5. *R. hyperboreus* Rottb. var. *natans* Rgl.
- + Leaf blade 3-5-lobate-partite, more or less conspicuously notched at
base, rather thick, lustrous above; receptacle globose, hairy; petals
5; sepals 5 4. *R. natans* C.A.M.
4. Submerged leaves with filiform petioles, 8-12 cm long, these and
branches verticillate- or opposite-approximate; corolla and calyx
usually trimerous 7. *R. polyphyllus* Kit.
- + Submerged and floating leaves with a developed blade, not opposite-
approximate; corolla and calyx usually pentamerous
. 1. *R. gmelini* DC.
5. Calyx and corolla trimerous, rarely tetramerous; leaves rounded or
cuneate; receptacle glabrous. Small Arctic sometimes cespitose
plants with spreading stems 6.
- + Calyx and corolla pentamerous, occasionally tetramerous or the
corolla pentamerous and the calyx 3-4-merous; leaves basally
notched; receptacle pubescent 7.
6. Leaves cleft into 3 outward-spreading broad lateral lobes; flowers to
6 mm in diameter. Plants not cespitose 5. *R. hyperboreus* Rottb.
- + Leaves deeply tripartite, with narrow-oblong upward-pointing lobes;
flowers to 3 mm in diameter; fruiting head to 2-3 mm in diameter.
Minute cespitose Arctic plants 6. *R. samojedorum* Rupr.
7. Leaves glabrous, broadly trilobate or tripartite, with subentire lobes,
broadly cordate-notched at base; receptacle subglobose
. 3. *R. radicans* C.A.M.
- + Entire plant hairy; leaf blade deeply 3-5-partite; receptacle oblong,
elongated 8.
8. Calyx 3-4-merous; stems densely hairy, to 10-30 cm high, erect from
above the base; fruitlets with obsolete beak . . . 2. *R. reptabundus* Rupr.
- + Calyx 5-merous; stems glabrate or with scattered sericeous hairs,
to 6-20 cm high; beak of fruitlets to 0.3-0.6 mm long, slender,
distally hamate 1. *R. gmelini* DC.

1. *R. gmelini* DC., Syst. Veget. I (1818) 303; Prodr. I, 35; Kryl., Fl.
Zap. Sib. V, 1192, ex pte. — *R. purshii* Ldb., Fl. Ross. I (1842) 35, ex
pte, non Hook. — *R. pusillus* Ldb. in Mém. de l'Acad. Pétersb. V (1815)
354 546, non Poir. — Ic.: Gmel., Fl. Sib. IV, tab. LXXXIII-a, fig. B. — Exs.:
HFR, No. 2501.

Perennial, small, prostrate, palustrine or aquatic; stems elongated, to
6-22 cm, slender, somewhat branched, 2-5-flowered, glabrous or in upper
part with appressed sericeous hairs; leaves long-petioled, the upper cauline
leaves short-petioled or subsessile, the petioles broadened to a whitish-
scarious sheath, with nonconrescent auricles, the leaf blade to 10-15 mm

broad, to 8–9 mm long, orbicular or more or less reniform-rounded, quinquepartite almost to base into oblong-cuneate lobes with 3 deep narrow acute apical teeth (in fact there are 3 segments, the lateral ones are deeply parted), the underside — especially in young and upper leaves — with appressed sericeous hairs; in aquatic forms all leaves 5–8-partite almost to base, with long linear or almost filiform weak lobes (var. *aquatilis* Litw.) or else, in addition, (var. *heterophyllus* Ganesch.) with floating orbicular doubly trifid leaves with very broad lobes; leaves usually in groups of 2–3; uppermost leaves sessile, mostly at bifurcations of stem, 2–3-partite with small short lobes or entire; peduncles finely sulcate, with short appressed hairs or glabrous, elongating in fruit; receptacle more or less ovate or ovate-oblong, with scattered hairs; flowers 8–9 mm in diameter, larger in aquatic forms with 5-merous calyx and corolla; sepals curved, with a broad scarious border, ovate, glabrous or with scattered appressed hairs, somewhat shorter than the petals, the latter oblong-obovate, narrowing abruptly into the claw; fruitlets in a small oval head (to 2–3 mm in diameter), to 1.3–1.5 mm long, rounded-elliptic, glabrous, with convex sides, with a slender straight distally hamate-curved beak, to 0.4–0.6 cm long. July–August. (Plate XXIII, Figure 3, a–d).

Margins of herbaceous and peaty bogs, damp banks of rivers and lakes, boggy forests, small bodies of standing water in the polar-Arctic and forest zones, and rarely in the northern steppe zone. — Arctic: Arc. Eur. (rare). Arc. Sib., Chuk., An.; European part: Lad.-Ilm., Dv.-Pech., U.V., V.-Kama; W. Siberia: U. Tob., Ob, Irt., Alt.; E. Siberia: Yenis., Ang.-Say., Dau.; Far East: Kamch., Uda, Sakh., Ze.-Bu., Uss., Gen. distr.: Mong. Described from Siberia. Type in Leningrad.

2. *R. reptabundus* Rupr., Fl. Samoied. (1845) 10. — *R. scleratooides* Perf. in sched.

Perennial, 11–39 cm long, prostrate or ascending, or else with a prostrate stem rooting at the nodes and producing ascending leafy branched flower-bearing shoots; all except uppermost leaves petiolate, deeply tripartite, with oblong-obovate cuneate segments or the middle segment subacutely or obtusely tridentate, the lateral segments obovate, broader, the lateral bifid and dentate; leaf blade hairy (at least beneath), sometimes densely covered with appressed hairs; bracts sessile, tripartite, with short oblong-lanceolate entire or somewhat dentate lobes; stems profusely branched above, more or less many-flowered, with strict branches, often with more or less long appressed hairs as on the petioles; peduncles slender, slightly sulcate, with short appressed hairs; flowers small, 5–8 mm long, yellow; sepals 3–4, to 3 mm long, ovate, with fine hairs on the outside, obtuse, divergent with white-scarious margin; petals 5, or petals obsolete, elliptic, tapering to a short claw, to 4 mm long; receptacle narrowly oblong-elliptic, with short spreading hairs; fruit head oblong-oval, with numerous tightly appressed small fruitlets; fruitlets 1.2–1.4 mm long, more or less obovate, glabrous, smooth, somewhat compressed laterally, with a very short, obtuse straight beak to 0.2–0.4 mm long, distally sometimes very slightly curved-tipped. July. (Plate XXIII, Figure 5, a–d).

Damp meadows and boggy places. — European part: Dv.-Pech. (Arkhangelsk area). Endemic. Described from Arkhangelsk. Type in Leningrad.

3. *R. radicans* C.A.M. in Ldb., Fl. Alt. II (1830) 316; Ldb., Fl. Ross. I, 34. — *R. gmelini* var. *radicans* Kryl., Fl. Zap. Sib. V (1931) 1193. — *R. baicalensis* Turcz. in sched. — Ic.: Gmel., Fl. sib. IV, tab. LXXXIIIb; Ldb., Ic. pl. Fl. Ross. II, tab. 116. — Exs.: HFR No. 2503 (specimens not fully typical).

357 Perennial, small, palustrine plant; stems slender, glabrous, slightly branched above, 2–3-flowered, very often prostrate or [sic!] rooting at the nodes; leaves petiolate, usually in groups of 2–4; petioles glabrous, with a short broad whitish-scarious amplexicaul sheath and distal whitish auricles free from petioles; leaf blade 6–13 mm long, 18–23 mm broad, reniform-rounded, with a more or less straight or broadly cordate-notched base, glabrous, rarely hairy beneath, broadly trilobate or tripartite, the segments or lobes more or less broad-obovate, rounded entire or broadly 2–3-toothed, the lateral sometimes bifid or bilobate; uppermost leaves sessile or short-petioled, deeply tripartite, with entire or somewhat dentate oblong obtuse lobes; peduncles slender, glabrous, sometimes with minute bracts; receptacle subglobose, with scattered short hairs; sepals 5, glabrous, spreading-recurved, ovate, with broad whitish scarious margins, somewhat shorter than or about as long as petals; petals usually 5, light yellow, oblong-obovate, passing abruptly into a short narrow claw; limb of corolla to 9–11 mm in diameter; fruitlets in a compact more or less globose head to 5–7 mm in diameter, small, to 1.2–1.4 mm, obovate, glabrous, with somewhat convex sides, hamately involute from the middle or below, often with a dried-out tip. June–July. (Plate XXIII, Figure 4, a–d).

Damp riverbanks, or shallow sections of rivers and rivulets, bogs, damp sandy places, and open boggy birch and birch-and-larch forests. — W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau. Gen. distr.: Mong. Described from Altai. Type in Leningrad.

4. *R. natans* C.A.M. in Ldb., Fl. Alt. II (1830) 315; Ldb., Fl. Ross. I, 34; Kryl., Fl. Zap. Sib. V, 1192. — Ic.: Ldb., Ic. pl. Fl. Ross. II (1830) tab. 114.

Perennial, aquatic, floating, quite glabrous or the upper part and peduncles sometimes with small sparse appressed bristles; stems branched sulcate, stout (2–3 mm thick), floating, prostrate, with root fibers at almost every node; all leaves petiolate, the blade 13–15 mm long, 20–25 mm broad, reniform in outline, broadly 3–5-lobate to one-third or one-half, rarely beyond, the lobes broad, rounded at the apex, entire or with few small rounded teeth, slightly cordately notched or straight at the base, lustrous green above; uppermost leaves opposite, 2–3-lobate, sometimes entire, sometimes cuneate, with narrow, short-petioled lobes; all leaves with 2 scarious auricles at base of petioles; flowers 9–13 mm in diameter, golden yellow, with rather stout elongated peduncles; calyx and corolla 5-merous; sepals ovate or rounded-ovate, obtuse, glabrous, to 4 mm long, curved, readily deciduous; petals to 5 mm long, slightly longer than sepals, rounded-obovate, abruptly narrowing into a short claw; receptacle globose, 5–6 mm in diameter, with scattered short hairs and numerous fruitlets in a compact globose head to 6–8 mm in diameter; fruitlets rounded-obovate, to 1.5–1.9 mm long, glabrous, smooth, with a very short (to 0.2 mm) straight hamate-tipped beak (the tip of the beak dries early, and the beak then

appears straight) with a more or less well defined narrow ventral groove. June—July. (Plate XXIII, Figure 6, a—d).

Standing water, lakelets, small slow-flowing streams and rivulets, boggy places in mountain and foothill regions, rising to 4,000 m (Pamir). — W. Siberia: U. Tob. (Kokchetav Mountains), Irt. (Bayan Aul), Alt.; E. Siberia: Ang.-Say., Dau.; Centr. Asia: Balkh., Dzu.-Tarb., T. Sh., Pam.-Al. **Gen. distr.:** Dzu.-Kash., Mong. Described from Altai. Type in Leningrad.

358 **Note.** The East Siberian plants have a rather distinctive habit, smaller dimensions, and sometimes cuneate leaves, and it may be necessary to separate them as a distinct variety. Further observations and collections are required.

5. *R. hyperboreus* Rottb. in Act. Univers. Hafn. X (1770) 458; * Ldb., Fl. Ross. I, 35; Kryl., Fl. Zap. Sib. V 1194. — Ic.: Rottb. in Fl. Dan. II (1763) tab. 331 (sub nom. *R. lapponicus*); Rottb. in Act. Hafn. X (1770), tab. 4, f. 16 (non vidi). — Exs.: HFR, No. 2505.

Perennial, small, Arctic plant, quite glabrous, with creeping stems rooting at the nodes, or else floating; leaves petiolate, the blade more or less obovate or reniform in outline, to 0.5–0.7 (–0.9) cm long, to 0.5–0.7 (–1.2) cm broad, cleft for one-fourth to half its length, rarely more deeply, into 3 obtuse, orbicular, broad, entire lobes, more rarely the lobes, especially the lateral obtusely 2–3-incised-dentate, the lateral lobes usually spreading, the blade cuneate or rounded; upper leaves sessile or short-petioled, deeply (often almost to base) 2–3-partite, with oblong lobes; bracts entire; all leaves with a broad amplexicaul whitish-scarious sheath; flowers 6–8 cm in diameter, 1–3 per pedicel in upper part of stem; sepals usually 3 or 4, glabrous, concave, 3–4 mm long, broad-ovate, with broad whitish-scarious margin, spreading or recurved; petals usually elliptic or oblong-elliptic, to 4 mm long, passing abruptly into a short claw, with a nectariferous gland in a basal saccul; receptacle glabrous, oblong or oblong-elliptic; fruitlets crowded in an oval head 4 mm in diameter to 1.2 mm long, rounded-obovate, glabrous, smooth, with a narrow troughlike ventral slit and a slender straight hemate-tipped beak, to 0.2 mm long, often drying out. June—July. (Plate XXIII, Figure 7, a—d).

Damp and peaty meadows and boggy tundras, banks of rivers and lakes, and small pools. * Arctic: Nov. Z., Arc. Eur., Arc. Sib.; European part: Kar.-Lap. **Gen. distr.:** Arctic. Described from Arctic Europe (Lapland).

6. *R. samojedorum* Rupr., Beitr. zur Pflanzenkd. Russ. Reiches II, (1845) 28. Russian name: Lyutik nenetskii [Nenets].

359 Perennial, small, to 1–2 cm high, closely related to *R. hyperboreus* Rottb. but smaller, more cespitose, the leaves smaller, parted into 3 narrowly oblong cuneate nondivergent entire lobes; fruiting heads less compact, one-third to half the length in *R. hyperboreus*; distinguished from *R. gmelini* by the cuneate-triangular outline of the leaves and by the very small beak of the fruitlets. July. (Plate XXIII, Figure 8).

Sandy-argillaceous damp and mossy places, banks of rivulets; always in clusters and forming mats together with mosses. — Arctic: Arc. Eur., Arc. Sib. Endemic. Described from the Bol'shezemel'skaya Tundra. Type in Leningrad.

* I have not seen this work, but am citing Ledebour.

7. *R. polyphyllus* Kit. in Willd., Sp. pl. II, (1799), 1331; Ldb., Fl. Ross. I, 33; Kryl., Fl. Zap. Sib. V, 1188. — Ic.: Rchb., Ic. Fl. Germ. IV (1838–1839), tab. II; Syreishch., Fl. Mosk. gub. II, 158.

Perennial, almost always floating; stems to 1 m long, with branches and leaves verticillate or opposite, approached; upper leaves alternate; submerged leaves reduced to filiform petioles, 8–15 cm long; floating leaves 4–23 mm long, the blade lanceolate or oblong-elliptic, entire, sometimes broader and apically tridentate, one-tenth to half the length of the petioles; flowers small, 5 mm in diameter, yellow, pedicels initially small and straight, considerably elongated (to 5–12 cm) and arcuately curved in fruit; calyx and corolla usually 3-merous; sepals ovate, obtuse, to 2 mm long, glabrous; petals oblong-obovate, to 2.6 mm long, with an open nectar pit; fruitlets obovate, convex and slightly compressed laterally, smooth. 1–1.4 mm long, narrow winged scarious border, especially below, very short straight beak. May–June.

Peaty lakes and bogs, in and around water. — European part: U. V., V.-Kama, U. Dnp., M. Dnp., V.-Don, Transv., Bl., L. Don, L. W.; W. Siberia: Ob (S.), U. Tob., Alt.; E. Siberia — Ang.-Say. (westernmost part). Gen. distr.: Centr. Eur. Described from Hungary. Type in Berlin.

Section 2. *COPTIDIUM* Nym., Consp. Fl. Eur. I (1878) 13. — Sect. *Marsypadenium* b. *coptidium* Prantl in Engl. Bot. Jahrb. IX (1888) 266 et in Engl. u. Prantl, Nat. Pflzfm. III, 2, 65. — Fruitlets 5–7 mm long, oblong-elliptic, with a convex lower part containing the seeds and a somewhat compressed upper half with loose white tissue, smooth, with inconspicuous veins; perianth triple, with spreading or recurved segments; petals (nectaries) 5–8 or more. Palustrine or aquatic-palustrine plants with prostrate or ascending, rarely erect stems, stems always prostrate in their lower part where adventitious roots develop at the nodes and where creeping rootstock suckers, very similar to the stems, are common. Flowers yellow, pale yellow, white, or reddish violet.

In the flora of the USSR this section is represented by 2 species confined to or mainly to the Arctic-polar zone.

- 360 1. Flowers yellow; leaves tripartite. Plants of bogs or damp places 8. *R. lapponicus* L.
+ Flowers reddish violet or white; leaves entire, with tridentate apex.
Palustrine-aquatic plants 9. *R. pallasii* Schlecht.

8. *R. lapponicus* L., Sp. pl. (1753), 553; DC., Prodr. I, 35; Ldb., Fl. Ross. I, 316; Kom., Fl. Kamch. II, 147; Kryl., Fl. Zap. Sib. V, 1194. — Ic.: L., Fl. Lapp. ed. 2 (1792) tab. 3, f. 4; Lindm., Svensk Fanerogamfl. (1918) 258. — Exs.: HFR No. 1904, 2504.

Perennial, 7–20(25) cm high, glabrous; rootstock-creeping, long, cord-like, white, slightly rooting at the nodes which often bear a single long-petioled leaf; roots slender, fiberlike; stems often semiprostrate from the base, simple, 1-flowered, sometimes with adventitious roots arising from the lower nodes, mostly with 1 or 2 leaves; leaves long-petioled, the blade rounded-reniform or reniform or orbicular in outline, broadly cuneate,

rarely — due to proximity of lateral segments — with an overlapping base, 17–30mm long, to 20–43mm broad, tripartite to three-fourths or beyond but not to base, with broadly rounded-obovate, mostly approximate segments, the middle segment cuneate, more narrow than the broad almost obreniform lateral ones, all segments with broad subobtus rounded teeth; flowers solitary, yellow, 8–13mm in diameter, with long erect peduncles; sepals recurved, ovate, somewhat shorter than petals; petals 5–8, oblong-elliptic, tapering into claw; fruitlets numerous, in a loose head, oblong-elliptic, readily deciduous, convex, somewhat flattened laterally, 4–5.5mm long, glabrous, smooth, with a hamately curved tapering beak to 1–1.4mm long. June–July. (Plate XXIII, Figure 2, a–c).

Peaty and riparian shrubby tundra, mossy bogs, and boggy coniferous (spruce, spruce and Siberian stone-pine, larch) forests. — Arctic: Arc. Eur., Nov. Z., Arc. Sib., Chuk., An.; European part: Kar.-Lap., Dv.-Pech., V.-Kama, Urals; W. Siberia: Ob; E. Siberia: Yenis., Lena-Kol., Ang.-Say., Dau.; Far East: Kamch., Okh., Ze.-Bu., Uss. **Gen. distr.:** Arc. Scand., Ber. Described from Lapland (Sweden). Type in London.

9. *R. pallasii* Schlecht., Animadv. Ranuncul. I (1819), 15; Ldb., Fl. Ross. I, 31; Kom., Fl. Kamch. II, 146; Kryl., Fl. Zap. Sib. V, 1185. — Ic.: Schlecht., l. c., tab. II.

361 Perennial, glabrous, prostrate-ascending with creeping hollow leafy more or less branched stems and numerous adventitious roots developing at the nodes simultaneously with the leaves, the lower prostrate parts of stem die gradually, the ascending upper parts producing new shoots with ascending floriferous stems; leaves long-petioled, the blade rather thick, mostly elongate-ovate or elongate-obovate-cuneate, rarely broadly obcuneate, trifid or trilobate at the apex, with entire obtuse or rarely dentate lobes, the middle lobe broader than the divergent lateral lobes; petioles long, hollow, with amplexicaul sheath; flowers solitary, large, 1.7–2.8 cm in diameter, violet reddish or pale, almost white, with 6–12 petals; sepals 3, rarely 4, curved, ovate, spreading, to 8mm long; petals obovate-cuneate or oblong-obovate, rounded at the apex, tapering into claw; fruiting head flattened-rounded, more or less loose, to 10mm long, 12–13mm broad; fruitlets to 5–7mm long, oblong-elliptic, sometimes somewhat curved, smooth, glabrous, convex, slightly compressed laterally, more or less gradually tapering into a straight subacute beak. June–July. (Plate XXIII, Figure 1, a–c).

Boggy tundras, lakeshores, oxbows, pools, boggy places in the polar-Arctic zone. — Arctic: Arc. Eur., Nov. Z., Arc. Sib., Chuk., An.; Far East: Kamch., Ok., Uda. **Gen. distr.:** Arctic, Ber. Described from the west coast of Arctic America (St. George Island in the Aleutians). Type in Berlin.

Section 3. **FLAMMULA** Webb. — Subgenus *Flammula* Webb. ex Spach, Hist. Veg. VII, (1839) 208. — Sect. *Hecatonia* DC., Prodr. I (1824) 30, 32; Ldb., Fl. Ross. I, 31. — Sect. *Buthyranthus* subsect. *Flammulae* Prantl in Engl. Bot. Jahrb. IX, (1888), 267; Ej. in Engl. u. Prantl, Nat. Pflzfm. III, 2, 65. — Characters in the key.

1. Stems prostrate-decumbent, rooting at all nodes; internodes arcuately curved; leaves entire, linear or filiform-linear, passing inconspicuously into petioles 13. *R. reptans* L.
- + Stems strict or weak ascending, if rooting then at the lowermost nodes; petioles clearly set off from the blade or the leaves sessile 2.
2. Stems ascending, more or less weak, usually rooting in lower nodes or erect, more or less strong; leaves petiolate; flowers to 1–1.5 cm in diameter 3.
- + Stems strict, hollow, stout; rootstock creeping, jointed; leaves sessile lanceolate; flowers to 2.5 cm or more in diameter 5.
3. Annuals; leaves entire, with small remote teeth, rounded, often cordately notched; fruitlets small, villous-tuberculate at the sides 15. *R. ophioglossifolius* Vill.
- 362 + Perennials; leaves entire or dentate, rounded at base or cuneate; fruitlets smooth 4.
4. Stems ascending, more or less weak, often rooting at base, glabrous or with scattered slender hairs 12. *R. flammula* L.
- + Stems erect, without adventitious roots, proximally with scattered small setose hairs 14. *R. strigillosus* Boiss. et Huet.
5. Leaves broadly long-lanceolate with very sparse small teeth; stems mostly glabrous, appressed-pubescent above; flowers to 3–4 cm in diameter; fruitlets glabrous 10. *R. lingua* L.
- + Leaves elongate, linear-lanceolate, entire, like the stems covered with appressed setose hairs; flowers to 1.6–2.5 cm in diameter; fruitlets with isolated, short, late-deciduous hairs 11. *R. amurensis* Kom.

Series 1. *Lingui* Ovcz. — Stems erect, tall; leaves sessile, undivided, entire or sparsely denticulate, lanceolate; flowers 2.5–4 cm in diameter.

10. *R. lingua* L., Sp. pl., (1753), 549; Ldb., Fl. Ross. I, 31; Kryl., Fl. Zap. Sib. V, 1185. — Ic.: Syreishch., Fl. Mosk. gub. II (1907) 158; Rchb., Ic. Fl. Germ. f., 4596. — Exs.: HFR No. 352, a et b. — Russian name: lyutik dlinnolistnyi [long-leaved].

Perennial, large, 50–115 cm high; stem erect, stout, hollow, little branched, glabrate or rarely with scattered appressed hairs; rootstock with long joints and verticillate root fibers at the nodes; leaves sessile, elongate-lanceolate, the blade gradually tapering toward apex, acuminate, to 15–30 cm long, to 1–5 cm broad, entire or sparsely denticulate, narrowed at base, then broadening into an amplexicaul scarious-margined distally ciliate sheath; flowers 3–4.5 cm in diameter; calyx and corolla 5-merous; petals broad-obovate; receptacle oval, glabrous; fruiting head subglobose or oval, 10–11 mm in diameter; fruitlets glabrous, smooth, obovate, somewhat compressed laterally, 2.5–3.2 mm long, with a narrow scarious dorsal border and an inconspicuous border along the ventral part, the straight beak to 0.8–1 mm, hamately curved distally. July–August.

Hypnum-sedge, herbaceous bogs and boggy meadows, ditches, lakeshores and riverbanks, ubiquitous in the forest zone, becoming sparse in the steppe zone. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. Dnp., M. Dnp., V.-Don, Transv., Bl., L. V., Urals; Caucasus: rare, in

all regions except Talysh; W. Siberia: Ob, U. Tob., Irt., Alt.; E. Siberia: Yenisei, Ang.-Say.; Centr. Asia: Ar.-Casp., Balkh., Dzu.-Tarb. **Gen. distr.:** W. and Centr. Eur., Dzu.-Kash., Ind.-Him. Described from N. Europe. Type in London.

Note. This species varies greatly from glabrous to very strongly pubescent forms (var. *hirsutus* Wallr.) with a broad leaf blade, etc. var. *submersus* Glück (= *f. aquatilis* Nazar.) is a form of deep water bodies, with broad cordate submerged leaves and sometimes with floating stems. All such changes seem to depend on ecological conditions.

11. **R. amurensis** Kom., Fl. Manchzh. II, 1 (1903) 294.

Perennial; rootstock creeping, long, with bundles of slender root fibers at the nodes; stems to 40–60 cm long, erect, hollow, finely sulcate, with one to several flowers; leaves sessile, amplexicaul, linear-lanceolate, elongate, upward-pointing, entire, acute, covered like the stems with setose appressed hairs; flowers 1.6–2.5 cm in diameter; sepals 5, appressed-hairy, obtusely rounded, one-third to two-fifths the length of the petals; petals obovate; fruiting head ovoid-rounded; fruitlets somewhat oblong, obovate, with isolated short appressed setose hairs becoming obsolete; beak very short, whitish, with a callous thickening, straight, distally curved; receptacle glabrous, more or less globose and becoming cylindric. June–August.

Bogs, damp and boggy forests, rice fields, and overgrown oxbows. — Far East: Ze.-Bu., Uss. **Gen. distr.:** Jap.-Ch. Described from the Far East (interfluvium of the Uril and Khar rivers). Type in Leningrad.

Series 2. **Flammuli** Ovcz. — Stems prostrate and rooting at the nodes or ascending, glabrous or glabrate; leaves petiolate, entire or sparsely denticulate; flowers not more than 10–15 mm in diameter.

12. **R. flammula** L., Sp. pl., (1753) 548; Ldb., Fl. Ross. I, 32 ex pte.; Kryl., Fl. Zap. Sib. V, 1186. — Ic.: Hegi, Illustr. Fl. III (1909) tab. 119, f. 2. — Exs.: HFR No. 302; Fl. polon. exsicc., ed. a. Weloszczak No. 703; Pl. Finl. exsicc. No. 658. — Vernacular name: pryshchenets.

Perennial; stems solitary, 15–50 cm long, erect or ascending, sometimes rooting at the lower nodes, glabrous or covered with sparse appressed hairs, branched in upper part, with several to many flowers; petioles of radical and lower cauline leaves as long as, rarely twice as long as the blade, the latter oblong-elliptic, almost ovate-lanceolate, lanceolate, or linear-lanceolate, acute, entire or sparsely denticulate, 3–7 cm long, 3–12 (–28) mm broad; upper cauline leaves narrow, sublinear, sessile or short-petioled; peduncles finely sulcate, covered with short appressed hairs or glabrate; flowers 10–15 mm in diameter, calyx and corolla 5-merous; sepals hairy, oblong-ovate, spreading, 3–4 mm long; petals yellow, broad-obovate, 5–6 mm long; receptacle glabrous, rounded-clavate or slender cylindric (var. *gracilis* C.A.M.); fruitlets to 1.5–1.7 mm long, with convex sides but somewhat compressed laterally, glabrous, smooth, with an often curved very short beak to 0.3 mm and an obscure scarious dorsal border. June–August.



PLATE XXIII. 1 — *Ranunculus pallasii* Schlecht., a) leaf, b) fruitlet, c) fruitlet in longitudinal section; 2 — *R. lapponicus* L., a) leaf, b) fruitlet, c) fruitlet in longitudinal section; 3 — *R. gmelini* DC., a) leaf, b) receptacle, c) fruitlet, d) nectary; 4 — *R. radicans* C.A.M., a) leaf, b) receptacle, c) fruitlet, d) nectary; 5 — *R. reptans* Rupr., a) leaf, b) receptacle, c) fruitlet, d) flower; 6 — *R. natans* C.A.M., a) leaf, b) fruiting head, c) fruitlet, d) flower; 7 — *R. hyperboreus* Rottb., a) leaf, b) fruiting head, c) fruitlet, d) flower; 8 — *R. samojedorum* Rupr. (magnified).

Inundated meadows and sedge bogs, riverbanks, occasionally in water, mainly in the forest zone. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U.V., V.-Kama, U.Dnp., M.Dnp., V.-Don, Transv., Bl. (N.), L. Don, Urals; W.Siberia: Irt.?, Alt. (rare). **Gen. distr.:** Scand., Centr. Eur., Atl. Eur., Med. (N.part, mountains). Described from Europe. Type in London.

Note. This species comprises three forms: terrestrial, floating (*f.natans* Glück), and submerged (*f.submersus* Glück), reflecting ecological modifications developed in relation to the habitat. They represent, as it were, reduced forms of the typical terrestrial plants with leaves as well as flowers undergoing reduction; this reduction is particularly noticeable in *f.submersus*.

13. *R. reptans* L., Sp. pl. (1753), 549; Kryl., Fl. Zap. Sib. V, 1187. — *R. flammula* var. *reptans* Fleisch., Syst. Verz. Ostseeprov., (1830), 74. — *R. flammula* var. γ Ldb., Fl. Ross. I, (1842), 32. — Ic.: Syreishch., Fl. Mosk. II (1907) 157; Rchb., Ic. Fl. Germ. IV, (1838–1839) tab.10; Lindm., Svensk. Fanerogfl., (1918), 258. — Exs.: HFR No.1354 and No. 1354b. —

367 Perennial, small, glabrous or glabrate, with creeping filiform branched stems rooting at the nodes; leaves narrow-linear, subfiliform, rarely linear-lanceolate, gradually and often inconspicuously passing into petioles; peduncles glabrous or slightly appressed-hairy; flowers small, yellow, 5–9 mm in diameter; sepals 5, ovate, obtuse, to 2 mm long; petals 5, oblong-elliptic or obovate-elliptic, 3.5–5 mm long, passing abruptly into a narrow claw with open basal nectariferous gland; fruiting head globose, ca. 2–3 mm in diameter, loose, usually with few fruitlets of which sometimes all but 2–3 are abortive; fruitlets obovate, slightly compressed laterally, smooth, glabrous, to 1.5–2 mm long, and with a 0.3–0.4 mm beak curved only at the tip; receptacle glabrous. June–August.

Damp banks and bottoms of dried-up lakes, pebbly and silty riverbanks and damp meadows, and rarely sedge bogs. — Arctic: Arc. Eur., Arc. Sib., Chuk., An.; European part: Kar.-Lap., Dv.-Pech., V.-Kama, Lad.-Ilm., U.V., U.Dnp., Urals; W.Siberia: Ob, U.Tob., Irt., Alt.; E.Siberia: Lena-Kol., Ang.-Say., Dau.; Far East: Uss., Kamch., Okh. **Gen. distr.:** Arc. Eur., Scand., Centr. Eur., Mong., N.Am. Described from Sweden. Type in London.

Series 3. Strigillosi Ovcz. — Perennial, stems erect, slender with appressed setose white hairs; flowers not more than 15 mm in diameter; fruitlets smooth, glabrous.

14. *R. strigillosus* Boiss. et Huet in Boiss., Diagn. ser. II, 5 (1856) 7; Boiss., Fl. Or. I, 52; Suppl. 14; N. Busch in Fl. cauc. crit. III, 3, 135.

Perennial, to 16–30 cm high, with a short rootstock; stems erect, slender, few-leaved, with appressed setose white hairs, 1–3-flowered; lower leaves oblong-elliptic or lanceolate-elliptic, acuminate, cuneate, entire or with acute teeth near the apex, petiolate; upper leaves narrow-linear, sessile or subsessile, with prominent parallel veins and appressed setose hairs

beneath, tapering to an elongated cuneate base; flowers 1.2–1.4 cm in diameter; sepals curved, ovate, obtuse, with appressed scabrous hairs; petals yellow, obovate or broadly inversely subtriangular, sometimes slightly notched apically, 5.5–10 mm long; fruiting head more or less rounded-ovate; receptacle glabrous; fruitlets small, to 1.5–1.8 mm long, obovate, somewhat compressed laterally, with a short conical scarcely hamate beak. July–August.

Damp and boggy localities, banks of rivulets and spring. — Caucasus: E. and S. Transc. **Gen. distr.:** Arm.-Kurd., Iran. Described from Turkish Armenia. Type in Geneva.

Series 4. **Ophioglossifolii** Ovcz. — Annuals or biennials; stems erect, sometimes with basal adventitious roots; flowers small, to 10 mm in diameter; fruitlets scarcely punctate, their sides with villous readily deciduous hairs.

- 368 15. **R. ophioglossifolius** Vill., Hist. pl. Dauph. III, (1789) 731; DC., Prodr. I, 43— Ldb., Fl. Ross. I, 47; Boiss., Fl. Or. I, 53; N. Busch in Fl. cauc. crit. III, 3, 135. — Ic.: Vill., l.c., tab. 49; Rchb., Fl. germ. IV, (1838–1839), tab. 21, f. 4613. Exs.: Herb. Norm., ed. Dörfler No. 5202 (Hungaria).

Annual, 14–24(–35) cm high, in lower part of stem nodes often produce bundles of slender cordlike fibers; stems hollow, erect, glabrous or covered with fine appressed hairs above, mostly strongly furcately branched in upper part; leaves entire, the lower and sometimes also the middle cauline leaves ovate, cordate or rounded at base, long-petioled; upper leaves oblong-lanceolate, gradually tapering to petiole or sessile, sometimes covered with small appressed hairs; all leaves alternate, sometimes opposite-approximate above, remotely serrate-dentate or undulate; petioles with amplexicaul sheaths; flowers small, 10 mm in diameter, yellow; sepals spreading, more or less ovate, scarcely appressed-hairy, greenish-yellowish, to 2–2.5 mm long, oblong-obovate or oblong-elliptic; fruitlets very small, to 1–1.3 mm long, orbicular or slightly obovoid, with a narrow dorsal border, slightly compressed laterally, with a very short tuberclelike beak, villous-tuberculate, especially in upper part or with short readily deciduous whitish setose hairs; receptacle clavately thickened, glabrous. April–June.

Damp and moist habitats, often clayey soil, grassy bogs and their margins, banks of rivulets, and sometimes inundated meadows. — European part: Crim.; Caucasus: W. and E. Transc., Tal. **Gen. distr.:** Centr. Eur., Med., Bal.-As. Min., Arm.-Kurd., Iran, N. Afr. Described from Dauphine, France.

Note. Plants from the Lenkoran area are distinguished by their profusely branched stems, a covering of setose hairs throughout, and oblong cauline leaves with serrate-dentate margins.

Section 4. **EUAURICOMUS** Ovcz. — Subg. *Auricomus* Spach., Hist. Veg. VII, (1839) 210 s. str. — Sect. *Marsypadenium* subsect. *Epirotes* Prantl in Engl. Bot. Jahrb. IX, (1888) 266 ex pte; Ej. in Engl.

u. Prantl, Pflzfam. III, 2, 65. — Stems erect or more or less ascending, with a bundle of numerous root fibers, occasionally with a scarcely developed slender vertical rootstock; stems with few to many flowers; radical leaves long-petioled, palmately 3–5 (rarely more)-partite or entire, elliptic or orbicular, the upper leaves more or less sessile, deeply parted; fruitlets glabrous or pubescent, convex, rarely somewhat compressed laterally, lacking a border, with a short straight or curved hamate-tipped beak.

- 369 1. Leaves small, compound, trisected into short-petioled deeply cleft segments 2.
- + Leaves simple, entire or tripartite, with broad entire, cleft or dentate segments 3.
2. Sepals densely covered with brownish rufous hairs; fruitlets glabrous 51. *R. rufosepalus* Franch.
- + Sepals covered with short slender whitish hairs; fruitlets pubescent or glabrous 50. *R. gelidus* Kar. et Kir.
3. Radical leaves elliptic or lanceolate-elliptic, unsegmented, entire or dentate, rarely incised-dentate; fruitlets glabrous; sepals covered with whitish or slightly rufous hairs 4.
- + Radical leaves orbicular or rounded-reniform or ovate, cordate, rarely cuneate 7.
4. Plants more or less densely covered with white hairs; sepals with appressed white hairs; radical leaves tridentate at the apex or subentire 19. *R. krassnovii* Ovcz.
- + Plants glabrous or glabrate; sepals with golden hairs or glabrate 5.
5. Radical leaves elliptic or oblong-elliptic, serrate-dentate or deeply cleft; flowers small, 1.3–1.7 cm in diameter; petals considerably longer than sepals 16. *R. pulchellus* C. A. M.
- + Leaves elliptic or lanceolate-elliptic, entire or with 1 or 2 minute teeth 6.
6. Flowers large, to 2–2.5 cm in diameter, with 5–6 rounded-obovate petals; stems simple or with 1–3 unequal branches, with one to several flowers 18. *R. pseudohirculus* Schrenk.
- + Flowers to 0.7–1 cm in diameter, with 5 often abortive petals as long as or about as long as the sepals; stems twice or thrice furcate, elongated 17. *R. longicaulis* C. A. M.
7. Entire plant more or less densely covered with long arachnoid hairs; radical leaves tripartite to the middle or beyond into obovate segments 49. *R. arachnoideus* C. A. M.
- + Entire plant glabrous, glabrate or more or less densely covered with straight nonarachnoid white hairs 8.
8. Radical leaves broadly cuneate, more or less spatulate with a cuneate base or ovate; sepals with dark brown, rufous brown, whitish brown, or rarely white hairs 9.
- + Leaves more or less orbicular, rounded at base or mostly cordate, if cordate then the plant densely covered with white hairs, not more than 7–10 cm high; sepals with rufous golden or white hairs or glabrous 11.
- 370 9. Leaves rather coarse, stiff, ovate, margin almost entirely dentate, rarely 3-cleft into broad lobes and serrate-dentate; sepals with brownish white hairs; receptacle glabrous 44. *R. fraternus* Schrenk.

- + Leaves rather thick, rounded-ovate, cuneate, palmately 3-5-fid, mostly with rounded-dentate lobes, the middle lobe narrower and subentire; sepals as well as the stems covered with white hairs; flowers to 2 cm in diameter 37. *R. pamiri* Korsh.
- ++ Leaves thinner, rounded-cuneate or spatulate-cuneate, with 3-5 or more large apical teeth or trilobate; sepals with dark brown, rarely grayish brown hairs; receptacle with grayish brown hairs 10.
10. Petals 6-10, broadly rounded-obovate, incised at the apex 42. *R. altaicus* Laxm.
- + Petals mostly 5, rarely more, rounded at the apex 41. *R. sulphureus* Soland.
11. Sepals covered with dark brown or golden rufous hairs 12.
- + Sepals covered with white hairs or glabrous 13.
12. Radical leaves glabrous, reniform, 3-5-partite almost to base or to the middle, with more or less obovate entire or subobtusely 1-2-toothed segments; sepals, as well as stems, covered with distant black-brown or dark brown hairs. Arctic plant, mostly small, 4-10 cm (rarely 16 cm) high 38. *R. nivalis* L.
- + Radical leaves conspicuously ciliate-margined, almost reniform-rounded, deeply tripartite, with cuneate segments cleft into 3 lobes; sepals with scattered subappressed golden hairs 39. *R. eschscholtzii* Schlecht.
- ++ Middle segment of radical leaves entire; sepals glabrous or glabrate 40. *R. pauperculus* Ovcz.
13. Radical leaves 4-10 cm long, 6-13 cm broad, 3-5-partite to the middle or beyond, with obovate lobes; stems curved, 1-flowered, covered (especially above) with distant slender hairs; flowers 7-11 mm in diameter; fruitlets glabrous. Small Arctic plant, 1-5 cm high 48. *R. pygmaeus* Wahlb.
- + Leaves, as also the entire plant, larger or, if small, then densely hairy and with several erect stems 14.
14. Radical leaves, or at least some of them, more or less palmatipartite, cleft deeply or almost to base into narrow lanceolate lobes, or divided to base into deeply incised or dentate segments 15.
- 371 + Radical leaves entire or tripartite to the middle or beyond, in the latter case blade more or less cuneate with 2-4-fid lateral segments 19.
15. Radical leaves tripartite to base, with deeply incised, sometimes very slightly petiolate parts; cauline leaves deeply 5-6-partite, their lobes deeply cuneate cleft 16.
- + Cauline and radical leaves mostly palmatipartite or cleft or if trilobate then uniformly rounded-dentate; lobes of cauline leaves linear-lanceolate or oblong-lanceolate, almost always entire, often [sic!] proximally connate 17.
16. Plants to 25-40 cm high, with few stems; flowers to 2.5 cm in diameter; sepals with obtuse whitish hairs 45. *R. songoricus* Schrenk.
- + Plants to 15-25 cm high, with numerous stems, often cespitose; flowers to 1.6 cm in diameter; sepals reddish with white hairs 47. *R. rubrocalyx* Rgl.

17. Radical leaves tripartite or broadly trilobate, uniformly coarsely dentate; stems glabrous; sepals with dull white or slightly golden hairs 46. *R. trautvetterianus* Rgl.
 + Radical leaves palmatipartite, with more or less distant soft hairs 18.
18. Radical leaves with scattered long hairs, deeply 7-15-palmatipartite, with linear-lanceolate unequally incised-dentate lobes, the middle lobe deeply incised with remote teeth; fruitlets pubescent or glabrous; flowers to 2.5 cm in diameter, with 5-7 broadly rounded-obovate petals 30. *R. pedatifidus* Sm.
 + Radical leaves rigidulous, glabrate, of two kinds: some ovate-rounded, with deeply incised dentate margins, the middle tooth larger, entire or with minute straight teeth, the other leaves deeply palmatipartite, with more or less broad-lanceolate entire or slightly dentate lobes; flowers small, to 0.8-1.5 cm in diameter, with 5 obovate slightly emarginate petals; fruitlets pubescent 31. *R. rigescens* Turcz.
 ++ Plants glabrate; radical leaves glabrous or glabrate, broadly triangular-ovate, parted almost to base into palmatipartite segments, with entire or slightly incised-dentate lobes; flowers to 1.2-2(-2.5) cm in diameter, with 5 petals; sepals remotely hairy or glabrate; fruitlets pubescent or glabrous 29. *R. affinis* R. Br.
- 372 19. Plants small, 3-7(-10) cm high, with dense white hairs 20.
 + Plants larger, glabrate or slightly pubescent 21.
20. Stems densely covered with semiappressed and appressed rigid hairs; leaves oblong-obovate, thrice deeply parted almost to base into oblong-obovate or oblong-cuneate segments, the apex entire or more or less deeply dentate; receptacle glabrous; fruitlets glabrous. Small high-mountain plant 35. *R. brotherusii* Freyn.
 + Stems densely, often almost tomentously covered with semiappressed soft hairs; leaves oblong-cuneate or spatulate-cuneate, thrice lobate-dentate, or cuneate-ovate; receptacle covered with short hairs; fruitlets covered with short hairs or glabrate. Larger plant 36. *R. popovii* Ovcz.
21. Fruitlets (pistils) glabrous 22.
 + Fruitlets (pistils) pubescent or hairy 24.
22. Blade of radical leaves inclined at an angle, transversely elliptic; stems with scattered short setose hairs 27. *R. subtilis* Trautv.
 + Blade of radical leaves not pendent, more or less rounded-reniform; stems glabrous or distally with scattered appressed ciliate hairs 23.
23. Radical leaves with an actually cordate open base, rarely subcuneate (as in *R. subtilis*), entire or shallowly tripartite, with broad rounded teeth; cauline leaves 3-5-partite to base, with entire or scarcely dentate lanceolate lobes; fruitlets 3-3.3 mm long, more or less compressed, with a thin border 28. *R. suukensis* N. Busch.
 + Plants smaller, to 8-20 cm high; stems weak, ascending; radical leaves rounded-reniform, thin, obtusely dentate-margined; cauline leaves 5-7-palmatipartite but not to the very base, with entire lanceolate-oblong lobes; fruitlets to 1.5-1.8 cm long, more or less convex, without a border 43. *R. alberti* Rgl.

24. Radical leaves deeply, often almost to base, tripartite, into narrow more or less cuneate segments, sometimes the middle segment almost petiolate; cauline leaves deeply palmatipartite; fruitlets glabrous or pubescent 25.
- + Radical leaves orbicular or reniform-rounded, entire or trifid with broad incised-dentate segments; fruitlets downy or hairy 27.
25. Roots slender, with an abbreviated thickened rootstock; radical leaves glabrous, tripartite, with broadly rounded cuneate subacutely lobate-cleft segments; stems glabrous; peduncles with appressed yellowish whitish hairs; petals in groups of 3 or 4, in all 8-14; receptacle pubescent 34. *R. lasiocarpus* C.A.M.
- 373 + Thickened cordlike root fibers clustered into a bundle; entire plant, including stems, glabrous or with a slight whitish pubescence; petals 5-6; receptacle glabrous 26.
26. Radical leaves deeply tripartite or almost trisected into cuneate, entire, slightly lobate or tridentate segments; sepals glabrous or glabrate; fruitlets with a short slightly curved beak 32. *R. polyrhizus* Steph.
- + Radical leaves deeply tripartite or trifid, their segments approximate or contiguous, lobate-rounded-dentate, ciliate-margined above or with short hairs on both surfaces; sepals hairy; fruitlets with a longer slender hamate or spirally volute beak 33. *R. ussuriensis* Kom.
27. Lobes of cauline leaves petiolate; fruiting head oblong 26. *R. anadyriensis* Ovcz.
- + Lobes of cauline leaves sessile; fruiting head ellipsoid 28.
28. Receptacle glabrous; lobes of cauline leaves narrow, entire or remotely incised-dentate; at anthesis [sic!] radical leaves reniform-rounded, deeply 3-5(6)-partite 20. *R. auricomus* L.
- + Receptacle glabrous; lobes of cauline leaves oblong-rhombic, with unequally incised-dentate margin; radical leaves trifid for more than half their length, their segments broad, irregularly rhombic, rounded-dentate, rarely subentire 25. *R. krylovii* Ovcz.
- ++ Receptacle hairy or slightly downy; radical leaves one or few, unsegmented, dentate or broadly trilobate 29.
29. Lobes of cauline leaves broadened at the apex, cuneate, with uniformly serrate-dentate margin; radical leaves orbicular, the narrowly cordate blade often bearing lateral processes; fruitlets densely hairy 21. *R. cassubicus* L.
- + Lobes of cauline leaves entire, linear or lanceolate or remotely and irregularly incised-dentate 30.
30. Lobes of cauline leaves lanceolate, with irregular, mostly remote short teeth; lobes of upper leaves entire; radical leaves entire, or more often trifid-trilobate [sic!]; fruitlets to 3-3.5 mm long, hairy 22. *R. megacarpus* W.Koch.
- 374 + Lobe of cauline leaves entire, linear or narrow-lanceolate 31.
31. Radical leaves 2 or 3 or more, with a straight or slightly notched base, entire or mostly tripartite to the middle, with unequal sections; fruitlets 2.6-3 mm long, the short beak hamate from base, rarely straight 23. *R. allemannii* Br.-Bl.

- + Radical leaves mostly solitary, entire, orbicular, mostly narrowly notched at base; fruitlets to 2.5–3 mm long, with very short beak to 1 mm long, hamate-tipped 24. *R. monophyllus* Ovcz.

Cycle 1. *Pulchelli* Ovcz. — Radical leaves elliptic or lanceolate-elliptic, unsegmented, entire or incised-dentate; the upper cauline leaves sessile, the lower short-petioled, all entire or tripartite; fruitlets glabrous, convex, with a slender twisted or straight beak.

Series 1. *Longicaules* Ovcz. — Glabrous or glabrate plants; sepals with pale rufous hairs or glabrate.

16. *R. pulchellus* C. A. M. in Ldb., Fl. Alt. II (1830), 333; Ldb., Fl. Ross. I, 33; Kryl., Fl. Zap. Sib. V, 1189 ex pte. — *R. macrodon* Turcz. in herb. — Ic.: Ldb., Ic. pl. Fl. Riss. II (1830), tab. 111. — Exs.: HFR No. 1905 (f. *hirsuta* Litw.).

Perennial, 15–20 (–32) cm high, glabrous, few-flowered, with a bundle of slender root fibers; stems erect, branching once or twice, rarely simple, 1–6-flowered, glabrous, rarely more or less densely covered throughout with long hairs (f. *hirsutus* Litw.); radical leaves 9–27 mm long, 4–13 mm broad, long-petioled, glabrous, glaucescent, somewhat coriaceous, elliptic or more or less oblong-elliptic, acute, with serrate-dentate or deeply incised margin; cauline leaves sessile, with scarious amplexicaul sheaths, sometimes with few appressed marginal cilia, 3–5-palmatipartite with elongate linear entire obtuse lobes or deeply dentate, and then the upper leaflets linear, entire; peduncles covered with somewhat rufous appressed hairs; flowers 1.3–1.7 cm in diameter; sepals 5, to 4 mm long, scarious-bordered, spreading, with appressed somewhat rufous golden hairs; petals 5, 8–10 mm long, to twice as long as sepals, obovate or elliptic; receptacle sometimes slightly short-hairy; fruiting head compact, oblong-ovoid; fruitless ovoid-elliptic, glabrous, to 2.5–2.7 mm long, with a straight short beak sometimes with a slightly curved tip to 0.6–0.9 mm long, glabrous, smooth, more or less convex, with a subobtusate dorsal keel, along which run (when the fruitlet is placed on its rib) 2 inconspicuous veins.

Damp, mainly solonchek meadows occasionally in subalpine meadows. — W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau. (rare); Centr. Asia: Dzu.-Tarb., T. Sh. (rare in the Aleksandrovskii [Kirghiz] Range). **Gen. distr.:** N. Mong., China. Described from the Chuya River valley in Altai. Type in Leningrad.

17. *R. longicaulis* C. A. M. in Ldb., Fl. Alt. II, (1830), 308; Ldb., Fl. Ross. I, 35. — *R. pulchellus* var. *longicaulis* Trautv. in Bull. Soc. Nat. Mosc. XXXIII, (1860) 68; Kryl., Fl. Zap. Sib. V, 1189. — Ic.: Ldb., Ic. pl. Fl. Ross. II, (1830), tab. 117.

Perennial, 20–35 cm high, with twice or thrice forked erect stems and a bundle of slender cordlike roots; stems mostly solitary, sulcate, slender, glabrous throughout, with slightly appressed slender dull or golden hairs, few-flowered, their branches upright, elongated, equal, radical leaves numerous, long-petioled, glabrous or with sparse ciliate hairs, somewhat coriaceous, elongate-elliptic or lanceolate-elongate-elliptic or even lanceolate,

gradually tapering to base, rarely somewhat rounded, mostly with 3 prominent veins, 1.6–4 cm long, 5–9 mm broad, entire, rarely with 1 or 2 minute teeth; lower cauline leaves usually petiolate, the blade lanceolate, entire, to 5 cm long, 3–4 mm broad; upper leaves and bracts sessile, entire, narrow-lanceolate or linear-lanceolate, with semiamplexicaul sometimes very slightly hairy-margined sheaths; peduncles straight, long, sulcate, with short light appressed rufous hairs; flowers 0.7–0.8 cm in diameter, often with abortive petals; sepals ovate, densely covered with short rufous hairs; receptacle with short hairs, cylindric; fruiting head oblong-ovoid; fruitlets 2.5–2.8 mm long, oblong-elliptic or ovate-elliptic, smooth, glabrous, with a basally broadened dorsal beak to 1 mm long. June–July.

Sedge bogs, damp boggy meadows, damp lakeshores, rivulets, and herbaceous bogs. — W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. **Gen. distr.:** Dzu.-Kash., Mong. Described from the Charysh River valley in Altai. Type in Leningrad.

18. *R. pseudohirculus* Schrenk in Fisch. et May., Enum. pl. nov. I, (1841), 65. — *R. pulchellus* var. *pseudo-hirculus* Trautv. in Bull. Soc. Nat. Mosc. XXXIII (1860) 68; Kom. in Tr. SPb. obshch. estestv. (1896) 60. — Russian name: lyutik bolotnyi [palustrine].

376 Perennial, 7–23 cm high, growing in small groups, sometimes cespitose with stems 4–5 cm long (var. *caespitosus* Ovcz.); stems simple or with 1–3 unequal branches, with one or few flowers, finely sulcate, with long scattered dull and golden semiappressed hairs; radical leaves, petiolate, glabrous or with sparse appressed ciliate hairs, elliptic or lanceolate-elliptic, entire; lower cauline leaf sessile, oblong-lanceolate, entire, tapering toward base and with a long scarious amplexicaul mostly glabrous sheath; upper leaves sessile, narrow-lanceolate, entire, with broadly rounded scarious mostly short-pilose sheaths bearing 2 auricles; peduncles with scarcely discernible grooves, covered with appressed short dull or somewhat rufous golden or almost whitish hairs; flowers large, 2–2.5 cm in diameter; petals 5–6, rounded-obovate, slightly tapering toward base, to 1 cm long; sepals 5–6 mm long, more or less retrorse or recurvate, broad-ovate, with scarious border, often reddish, mostly glabrous; fruiting head more or less oblong-conical; fruitlets ovoid, 2.5–3 mm long, glabrous, orbicular, convex, with a curved ensiform beak; receptacle glabrous. June–July.

Subalpine, rarely alpine meadows, damp meadows beside small rivers and rivulets, and near thawing snow at 3,000–4,000 m. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb., Tam.-Al., T. Sh. **Gen. distr.:** Ind.-Him., Dzu.-Kash., Mong. Described from the Dzungarian Ala Tau. Type in Leningrad.

Note. An extremely variable species. In the Zeravshan River basin a form occurs with very narrow long leaves, a long branched stem, and smaller flowers, hence the similarity to *R. longicaulis*. In the Dzungarian-Tien Shan a form occurs with very strong growth, larger flowers, and mostly hairy sepals; a Pamir-Tadzhik form with glabrous sepals, smaller growth and smaller flowers is also known. A low-growing cespitose form (var. *caespitosus* Ovcz.) occurs in the Pamir. However, transitions between all these forms may be found throughout their range.

Series 2. *Tibetici* Ovcz. — Plants covered with white hairs; sepals with sericeous hairs; leaves radical, apically tridentate with a large middle tooth, sometimes subentire.

19. *R. krasnovii* Ovcz., sp. nova in Addenda VI, p. 571. — *R. pulchellus* var. *tridentata* O. Fedtsch. in A.H.P. XXI (1903) 18.

377 Perennial, 4–9 cm high; roots slender, fiberlike, in a bundle; stems one or several, simple, often branched, with strong strict peduncles elongating in fruit and usually longer than the stems, more or less densely covered with semiappressed or spreading long white hairs, rarely glabrate; radical leaves petiolate, glabrous or (especially the petioles) with more or less remote hairs, the blade rounded or slightly cuneate, subentire, more often tridentate, with 2 small lateral teeth and a large oblong-ovate acuminate middle tooth; cauline leaves sessile or subsessile, similar to lower leaves but narrower and deeply incised, with hairy apex, cauline sheaths, the upper leaves entire, lanceolate, or tripartite with linear-lanceolate lobes; peduncles slightly sulcate, more or less densely covered with appressed whitish hairs; flowers 1–1.7 cm in diameter; sepals 5, ovate, appressed-hairy, more or less spreading, often with purple margin, 5–6 mm long; petals 5–6, obovate, cuneate, apically triangular (with oblique sides), to 9 mm long; receptacle glabrous, oblong; fruiting head ovoid; fruitlets glabrous, smooth, with a slender, 0.8–1 mm long twisted or curved, straight or slightly hamate-tipped beak. July.

Shortgrass meadows along rivulets at 3,700–4,230 m. — Centr. Asia: Pam.-Al. (confined to the Pamir). **Gen. distr.:** Ind.-Him., Tib. Described from the Pamir (between Lake Kara-Kul' and Muskol Pass). Type in Leningrad.

Cycle 2. *Auricomi* Ovcz. — Radical leaves orbicular or rounded-reniform [in outline], unsegmented and dentate or trifid for more than half their length, with broad segments; cauline leaves divided to base into entire or incised-dentate lobes; receptacle glabrous or hairy; fruitlets hairy.

20. *R. auricomus* L., Sp. pl. (1753) 551; Ldb., Fl. Ross. 1, 39, expte. — *R. auricomus* subsp. *typicus* Korsh., Fl. Vost. (1892) 89; Shmal'g., Fl. I, 20; Kryl., Fl. Zap. Sib. V, 200. — *R. auricomus* var. *typicus* Rupr., Fl. ingr. I (1860) 30. — *R. typicus* Rožanova in Tr. Petergof. Est.-Nauchn. Inst. (1931) No. 8. — Ic.: Rchb., Ic. Fl. Germ. f. 4599. — Exs.: HFR, No. 1551.

Perennial, 20–42 cm high, with a more or less dense bundle of root fibers; there are no leafless scales at base of stem, but fibers of dead leaves are often preserved; stems distally branched, with 3–6 or more flowers, glabrous, sulcate; radical leaves 5–6, long-petioled, petioles, with the exception of their distal part, glabrous, sulcate, the outer circle of leaves shed before fruiting, sometimes before anthesis, the leaf blade orbicular or cordate-rounded or reniform-rounded in outline, more or less deeply cordate, deeply 3–5(6)-sect, with oblong broadly cuneate apically broadened acutely incised-dentate lobes (especially the lateral lobes), or if the blade

378 trilobate then the lateral lobes considerably broader than the middle lobe, and all lobes more or less deeply rounded-incised-dentate; at anthesis [sic!] the leaves always deeply 3-5-partite or with petiolate segments; leaf blade glabrous or glabrate on both surfaces or with inconspicuous short appressed hairs along the veins above, but the young leaves more or less densely hairy along the veins above; leaf teeth rounded or acuminate; cauline leaves parted to base or almost to base into linear or lanceolate entire or very slightly dentate lobes, with short weak hairs at apex and at margins, 1-veined, obtusely rounded or subacute; peduncles appressed-hairy; flowers 1.2-2.2 cm in diameter; sepals 6-8 cm long, ovate-elliptic, slightly curved, membranous-margined, more or less appressed or slightly distant, covered with weak hairs; petals obovate, 7-10 mm long; stamens somewhat longer than the gynoecium; anthers 2 mm long; receptacle glabrous, oblong-ellipsoid or oblong; fruitlets 3 mm long, with a short remotely short-pubescent beak hamately curved from base. May-June.

Floodplain and dry-valley damp boggy meadows, forest margins, occasionally open broadleaf forests, mainly in the forest zone. - European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. Dnp., M. Dnp., V.-Don, Transv., Bl., L. Don, Urals; Caucasus: Cisc.: W. Siberia: U. Tob., Irt., Alt. Gen. distr.: Centr. Eur., Atl. Eur. Described from Europe. Type in London.

Note. Our conception of *R. auricomus* almost agrees with W. Koch's description (in *Berichte der Schweizerischen Botanischen Gesellschaft*, 1933, B. 42, Heft 2), but differs somewhat from the accompanying illustration. In the European part of the USSR *R. auricomus* is less distinguished by its long branches and numerous flowers, as illustrated by Koch (l.c., tab. 27, f.i.); besides the often petiolate segments - especially the middle segment - of the deeply quinquepartite blade of the radical leaves, there also occur shallowly parted and even subentire leaves. Judging by Linnaeus' description and by illustrations cited by him, such dimorphism of the leaves was formerly [considered as] also characteristic for *R. auricomus*. In addition to the type form of *R. auricomus*, in the Upper Volga and Middle Dnieper regions, plants as yet scarcely studied, occur which are closely related to *R. biformis* W. Koch (l.c., 745, tab. 27, f. 2), and characterized by less deeply parted (radical) leaves and by the appearance, at anthesis, of subentire or slightly trilobate leaves. (In *R. auricomus* palmatipartite leaves develop as far as the base before anthesis). Moreover, the flowers of *R. biformis* are larger than those of *R. auricomus*. W. Koch already established a separate species of the series *Auricomi* - *R. puberulus* W. Koch, distributed, according to him, in northern Switzerland and in the Jura to the Pays de Waas, France, Bavaria, and the [former] Palatinate. Characteristic for *R. puberulus*, as distinct from *R. auricomus*, are the short pubescence of the radical leaves, the subobtus tips of the leaf lobes, the broader lanceolate or linear-lanceolate lobes of the cauline leaves, and the mostly apically incised often abortive petals. Related to W. Koch's form, but not quite identical with it, is *R. auricomus* var. *palmatus* Zing. (described by Zinger).

As a result of the inadequate available herbarium material and the lack of detailed field observations, we consider it impossible to separate these forms.

21. *R. cassubius* L., Sp. pl. (1753) 551 (p.p. quoad plant. eur.): Ldb., Fl. Ross. I, 39 ex pte. — *R. auricomus* subsp. *cassubicus* Korsh., Fl. Vost. I (1892) 90; Ej., Tent. Fl. Ross. Or. I (1898) 15; Shmal'g., Fl. I, 20. — *R. christii* W. Koch in Berichte Schweiz. Bot. Gesell. 43 (1934) 126. — *R. pseudocassubicus* Christ. ex W. Koch in Berichte Schweiz. Bot. Gesell. 42 (1933) 750. — Ic.: Syreishch., Fl. Mosk. g. II (1907) 160; Fedch. and Fler., Fl. Evr. Ross. (1910) 434; W. Koch, l.c., tab. 30. — Exs.: HFR, Fasc. XVIII, No. 851.

Perennial, 30–50 cm high; stems long, distally branched, stout, more or less strong, sulcate, with 3–5 or more flowers, with 2 large membranous leafless sheaths at base, often fibrous remains of dead petioles, with a bundle of long firm almost black profusely branched roots and an abbreviated, sometimes well-developed rootstock; radical leaves large, their petioles with more or less long, widely scattered distant hairs or glabrous, the blade often to 9 cm long, to 12–16 cm broad, rounded-reniform or orbicular, narrowly cordately notched, the uniformly serrate-dentate margins approximate, sometimes overlapping, with asymmetric broad tapering and subacute narrow but obtuse teeth, the blade remotely appressed-hairy above, with scattered longer hairs beneath; cauline leaves dissected to base, their lobes, as those of lower leaves, distally arranged, cuneate (with the exception of the uppermost), broadened toward apex, uniformly more or less acutely serrate-dentate throughout, paler and glabrous or glabrate beneath, with short scattered hairs, especially along the veins above, peduncles remotely appressed-hairy; receptacle elongated, hairy; flowers 2–3 cm in diameter; petals obovate, broadened and rounded at the apex; sepals 7–8 mm long, slightly hairy, yellowish-brownish, more or less broad-elliptic; stamens at anthesis overlapping the gynoecium; anthers 2–3.5 mm long; fruitlets 4–4.5 mm long, very hairy, the slender straight beak to 1.5–1.7 mm long, slightly hamate-tipped. May–June. (Plate XXIV, Figure 3).

Forests and forest margins, among shrubs in the subzone of broadleaf oak and mixed forests, oak forests penetrating the forest-steppe zone, and in the north in several types of spruce and fir-spruce forests in the coniferous forest zone (e.g., in spruce forest with wood sorrel and broadleaf undergrowth, and in cowberry-spruce, etc.); it also grows in gardens and parks. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. Dnp., M. Dnp., Bl., S. Urals (Zlatoust area); W. Siberia: Alt. **Gen. distr.:** Scand., Centr. Eur. Described from Kassubia (N. Poland). Type in London.

Note. This species is extremely variable in type of leaf incision. The radical leaves may be entire or more or less deeply tripartite; the cauline leaves — commonly with incised-dentate lobes — are obscurely dentate in some forms. In the typical form, simultaneously with the development of 1 or 2 radical leaves, 2 or 3 more leafless scarious sheaths appear at the base of the stem, while in other cases there are 1 or 2 sheaths, and more leaves (*R. christii* W. Koch). W. Koch, in his work "Schweizerische Arten aus der Verwandtschaft des *Ranunculus auricomus* L." (Berichte der Schweizerischen Botanischen Gesellschaft 1933, B. 42, Heft 2) indicates that *R. cassubicus* is distinguished from his *P. christii* not only by the numerous basal scales but in addition by the broader and

more uniformly dentate lobes of the cauline leaves, by the stamens shorter than the fruiting head (the latter elongates after anthesis), by the longer anthers, and by the larger fruitlets with longer dense hairs and a longer beak. It is, of course, extremely difficult to distinguish between these species on the basis of such characters, and the borderline can only be drawn very tentatively. The complexity of the entire group of *R. cassubicus* is increased by the presence of forms transitional to *R. auricomus* L., *R. allemanni* Br.-Bl., and *R. megacarpus* W.Koch. Detailed field investigation of minor forms of *R. cassubicus* in particular regions together with a study of their ecological-topographic and geographical characteristics provides the best means of discovering the origin of all these forms. In this context, the relevant work of M. A. Rozanova (Tr. Petergof. Est.-Nauchn. Inst. (1931) No. 8) is unsuccessful, as species *R. allemanni* Br.-Bl., *R. cassubicus* L., and *R. auricomus* L., etc.) have not been separated.

22. *R. megacarpus* W.Koch in Berichte Schweizer. Bot. Gesell. 43 (1934) 126. — *R. hegetschweileri* W.Koch in Berichte Schweizer. Bot. Gesell. 42 (1933) 748. — Ic.: W.Koch, l.c., tab. 29, f. 6 (sub *R. hegetschweileri*). — Exs.: Pl. Finland. exs. No. 221 (sub nom. *R. auricomus* var. *fallax* Wimm.).

381 Perennial, to 18–30 cm high, with one or several erect slender few-flowered stems; radical leaves to 2 or 3, to 3–5.5 cm broad, 3–4 cm long, rounded-reniform [in outline], entire or trifid-trilobate, with a narrow middle lobe and broader lateral lobes, coarsely serrate-dentate, the blade with a broad open base, glabrate or shortly pubescent beneath; 2 or 3 free scarious sheaths at base of stem; cauline leaves palmatipartite to base with lanceolate lobes, the lower irregularly coarsely and mostly remotely dentate, the upper entire, narrow; flowers 2.5–3 cm in diameter, sometimes with abortive petals; stamens overtopping the pistil head; fruiting head rounded-ovoid, often with numerous abortive fruitlets; fruitlets to 3–3.5 mm long, to 2.5 mm broad, hairy, the slender beak to 1–1.5 mm long, straight from the base, strongly and broadly reflexed at the apex, and rarely slightly curved; receptacle covered with short hairs. April–June.

Forest meadows and forests. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. Dnp., M. Dnp., Bess., Bl. Gen. distr.: Centr. Eur. Described from Switzerland. Type in Zürich.

Note. The USSR plant does not entirely match Koch's description and may prove to be a separate species. The species of M. A. Rozanova (Tr. Petergof. Est.-Nauchn. Inst.) is determined as *R. cassubicus* var. *oblongifolius* Rozan. or as *R. casubius* var. *pseudoauricomus* Rozan. or even as *R. auricomus* var. *incisifolius*. It is easily distinguished by radical leaf blades which are thin, reniform-rounded, entire or tripartite, with a broad sometimes almost straight base, the narrow lanceolate lobes of the cauline leaves — the lower either less or more irregularly dentate than the upper, the hairy receptacle, and the large flowers often with abortive scales. Northern specimens of this plant (from the Leningrad Region) are distinguished by their large size, the predominantly trilobate blade of the radical leaves, and the many-flowered distally profusely branched stems. These plants should perhaps be regarded as a separate species.

23. *R. allemannii* Br.-Bl. in Jahresb. Naturf. Ges. Graub., LXVI (1928) 69 (non vidi); Koch in Berichte Schweizerisch. Bot. Gesell. 42 (1933) 747. — *R. auricomus typicus* var. *reniformis* Rozan. in Tr. Petergof. Est.-Nauchn. Inst. (1931) No. 8 ex pte. — Ic.: Koch., l. c., tab. 29, f. 5.

Perennial, 25–40(–45) cm high; rootstock mostly abbreviated, slender, with a bundle of root fibers; stems with 1–2 somewhat grayish brown basal scales, slender, mostly solitary, glabrous, simple, distally branching, with 2 or 3 or several flowers; radical leaves 2 or 3, sometimes one, long-petioled, reniform-rounded, with a straight or slightly notched base, margins very distant, never approximate, coarsely dentate with broad teeth, terminating in a thickened callous subobtuse prickle, the entire blade to 1.5–4 cm long, to 2.5–6(–8) cm broad, entire or especially in leaves which develop later — cleft to the middle, rarely beyond, into 3 unequal sections with the lateral broader than the middle section; leaf blade paler green beneath than above, its very conspicuous veins bearing short appressed bristles on the upper surface; cauline leaves divided to base into linear or linear-lanceolate entire lobes; peduncles elongated in fruit, finely pubescent; fruitlets small, 2.6–3.6 mm long, pubescent, orbicular or somewhat rounded-ovate, the slender straight beak, hamate-tipped, rarely hamately curved from the base. June–August.

Damp, sometimes peaty meadows, valleys of rivulet, sometimes in alder groves. — European part: Lad.-Ilm., Dv.-Pech. Described from Switzerland.

Note. The geography of this species has not been studied. We assign to this species the most typical specimens in the regions indicated above. It is distinguished from the typical *R. allemannii* by larger flowers and fruitlets. It sometimes resembles *R. megacarpus*, from which it is distinguished by smaller flowers, a slightly pubescent receptacle, and narrow entire cauline leaf lobes; moreover, these plants seem to occupy different habitats.

24. *R. monophyllus* Ovcz. in Not. Syst. Herb. Hort. Petrop. III (1922) 54. — *R. auricomus* var. *sibiricus* Glehn in A.H.P. IV (1876) 16. — *R. auricomus* subsp. *sibiricus* Korsh., Fl. Vost. Evr. Ross. (1892) 89; Shmal'g., Fl. I, 20. — *R. auricomus* Ldb., Fl. Ross. I (1842) 39 (quoad pl. *sibiricam*, non al.). — *R. cassubicus* Ldb., Fl. Ross. I (1842) ex pte (quoad. pl. *sibiricam*, non al.). — *R. sibiricus* Rozan. (non Korsh.) in Tr. Petergof. Est.-Nauchn. Inst. (1931) 1 No. 8. — *R. ochotensis* Rozan., ib.; *R. dahuricus* Rozan., ib. — Exs.: HFR, No. 204.

Perennial, 15–20(–25) cm high, with a bundle of slender roots and an abbreviated, rarely developed slender rootstock; leafless scales at base of stem at least 2, the upper considerably larger than the lower; stems solitary, erect or ascending, glabrous, sulcate; weak, simple or with 2 or 3, rarely more, branches in upper part, with 1–3, rarely 5 or 6 flowers; radical leaves one, rarely several, long-petioled, cordate-rounded, the blade more or less narrowly notched, with nonconverging margins or rarely more or less straight and then the blade reniform-rounded with an incised-dentate margin or rarely trilobate with a narrower more or less oblong middle lobe, glabrous beneath, glabrate above, with minute appressed almost setose hairs along the veins, with oblong-acuminate or broad, simple or cleft teeth, with slightly callous-obtuse apices; cauline leaves parted



PLATE XXIV. 1 — *Ranunculus krylovii* Ovcz., radical leaf and fruitlet; 2 — *R. monophyllus* Ovcz., fruitlet; 3 — *R. cassubicus* L., fruitlet; 4 — *R. brotherusii* Freyn, fruitlet; 5 — *R. popovii* Ovcz., fruitlet; 6 — *R. dolosus* Fisch. et Mey., fruitlet.

to base or almost to base into linear-lanceolate entire elongate lobes, occasionally some lobes incised, with one or rarely 2 elongated veins, glabrous beneath, glabrous or glabrate above, minutely ciliolate-margined; peduncles slightly pubescent; flowers 1.4–1.8 cm in diameter; sepals curved, distant, glabrate, 5–7 mm long, more or less elliptic with membranous distal margin; petals rounded-obovate, 9–10 mm long; receptacle covered with minute inconspicuous hairs or glabrous; fruitlets 2.5–3 mm long, covered with a minute very sparse down, sometimes subglabrate, the short slightly lateral beak to 1 mm long, straight, hamate-tipped. May–July. (Plate XXIV, Figure 2).

Damp meadows, riverbanks, rarely in grassy bogs and in mixed or birch forests in the forest zone, and occasionally in the forest-steppe zone. — Arctic: Arc. Eur., Arc. Sib.; European part: Kar.-Lap., Dv.-Pech., V.-Kama, Urals; W. Siberia: Ob, U. Tob., Irt., Alt.; E. Siberia: Yenis., Lena-Kol., Ang.-Say., Dau.; Far East: Kamch., Okh., Ze.-Bu., Uda, Uss., Sakh. **Gen. distr.:** Mong.?, Jap.-Ch. Described from the Bashkir ASSR (vicinity of Ufa). Type in Leningrad.

25. *R. krylovii* Ovcz., sp. nova in Addenda VI, p. 570. — *R. mono-phyllus* f. *latisectus* Ovcz. in Not. Syst. Hort. Bot. Petrop. III (1922) 55; Kryl., Fl. Zap. Sib. V (1931) 1200. — *R. altaicus* Rozan. in Tr. Petergof. Est.-Nauchn. Inst. (1931) No. 8, non Laxim. (1773).

Perennial, 10–20(–28) cm high, with a bundle of fiberlike roots and a short slender rootstock; leafless scales at base of stem 1–2; stems 1 or 2 to several, erect or ascending, weak, simple, rarely branching in upper part, 1–2(3)-flowered, glabrous, sometimes scarcely pubescent at the very summit; lower radical leaves 1–2(3), long-petioled, reniform-rounded, cordate, mostly trifid for more than half of their length, with broad asymmetrically rhombic more or less coarsely rounded-incised-dentate lobes, rarely the leaf blade unsegmented with rounded teeth, with scattered minute white lustrous hairs on both surfaces and rounded-oblong entire or small isolated teeth, abruptly terminating in a subobtuse point; petioles glabrous; cauline leaves parted to base or almost to base into large oblong-rhombic lobes, with irregularly rounded-incised-dentate margins, very scattered minute hairs above, glabrous or glabrate with 3–4 veins beneath; peduncles shortly appressed pubescent; flowers 1.2–1.5(–2) cm in diameter; sepals obovate-elliptic, slightly pubescent, 5–7 mm long, slightly spreading; petals obovate, 7–10 mm long; receptacle glabrous, oblong; [immature] fruitlets (mature fruits not seen by the author) 1.5–2 mm long, with a very sparse short down, the beak short, straight, to 0.5–0.75 mm long, hamately reflexed at the tip. June–August. (Plate XXIV, Figure 1).

Damp mixed forests, small birch forest outliers, mountains near the timberline, and patches of snow. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb., T. Sh. Endemic. Described from the Kuznetsk Ala Tau in the Altai. Type in Leningrad.

26. *R. anadyriensis* Ovcz. in Not. Syst. Hort. Bot. Petrop. III (1922) 56.

Perennial, 20–35 cm high; stems strong, more or less stout, slightly branched; radical leaves reniform-rounded, incised; lobes of cauline

leaves oblong-lanceolate, entire or scarcely dentate, petiolate; flowers to 2 cm in diameter; fruiting head oblong or long-oblong; style straight with hamate tip.

Arctic: Anadyr. Endemic. Described from the Anadyr River valley. Type in Leningrad.

Cycle 3. *Subtilis* Ovcz. — Radical leaves somewhat cartilaginous, orbicular or transversely elliptic, entire or cleft; fruitlets without a border, scarcely compressed laterally, glabrous; receptacle hairy.

27. *R. subtilis* Trautv. in Bull. Acad. Pétersb., X (1866) 393; Rupr., Fl. Cauc., (1869) 27; N. Busch in Fl. cauc. crit. III, 3 (1903) 130. — Ic.: Rupr., l.c., tab. 1, f. 2. — Exs.: Herb., Fl. Ross. Acad. Petrop., Fasc. XVI, No. 752.

387 Perennial, 17–33(–42) cm high; stems solitary, slender, erect, simple or slightly branched in upper part, 1–3-flowered, covered with sparsely short setose appressed hairs; radical leaves long-petioled, their petioles more or less curved with sparse appressed short finely setaceous hairs and a very short narrow scarious-lanate sheath, the leaf blade rigidulous, more or less transversely elliptic in outline, with particularly prominent veins beneath, glabrous, entire, almost cordate-rounded or rounded at base, rounded or truncate and coarsely rounded-dentate at apex, rarely the blade somewhat trilobate-cleft, characteristically the blade somewhat pendent (at an angle, rather than vertical, teeth apiculate and usually confined to distal part of blade, cauline leaves 1 or 2, deeply 2–4-partite, with linear lobes, rarely a sessile lower cauline leaf similar to the radical leaves; fruiting peduncles somewhat canaliculate, with scattered appressed setae; receptacle with a tuft of short setose hairs; sepals glabrous, rarely glabrate, divergent, oblong-elliptic or ovate-oblong, obtuse, 7(7.5) mm long, tapering to base with a thin scarious border, flowers 2–2.6 cm in diameter; petals 5, occasionally up to 8, obovate, scarcely crenulate, 11–13 mm long; fruitlets to 3 mm long, obovate, laterally compressed, carinate-margined (especially dorsally); fruitlet with a more or less conspicuous vein; beak to 0.5–0.75 mm long, broadening toward base, curved, and somewhat hamate-tipped. June–July.

Meadows and banks of rivulets in the subalpine and alpine zones to 2,100 m. — Caucasus: W. Transc. Endemic. Described from Mt. Nakhar in Abkhazia. Type in Leningrad.

28. *R. suukensis* N. Busch in Tr. Bot. Muz. Ak. Nauk., XIX (1926) 80. — Ic.: l.c., p. 83, tab. VIII.

Perennial, 15–38 cm high; stems 1 or 2, smooth, glabrous, slender, more or less flexuous, finely canaliculate, simple or usually distally 1- or 2-branched, with elongated slender more or less flexuous sericeous-hairy peduncles, bearing one to several flowers; radical leaves with long slender smooth petioles, the blade 1.3–3.8 cm long, 2.2–7 cm broad, reniform-rounded in outline, mostly with an acutely cordate open base, rarely broadly cuneate (as in *R. subtilis*), entire or shallowly tripartite, the median segment more or less oblong-elliptic, the lateral broad-obovate: all segments as also the entire margin of the blade to the marginal

excrecences of its base broadly rounded-dentate, the blade glabrous, short-ciliate-margined, dark green above, with a glaucescent tinge beneath; cauline leaves sessile, deeply 3-5-partite, their lobes lanceolate or linear-lanceolate, entire or with isolated teeth; sepals glabrate, spreading, 6-7 mm long, oblong-elliptic or oblong-ovate, obtuse; flowers 2.3-2.4 cm in diameter; petals 5, broad-obovate, slightly emarginate; receptacle ciliate-hairy, especially above; fruitlets broad-ovate, 3-3.3 mm long, laterally much compressed, minutely puncticulate, with a thin greenish border, and an elongated hamately curved beak to 1 mm long. June.

Rocks. — Caucasus: Cisc. (Balkariya). Endemic. Described from the Suuk-az River gorge in Balkariya. Type in Leningrad.

Cycle 4. *Affines* Ovcz. — Radical leaves palmatipartite, with 3 to many narrow linear or lanceolate lobes; cauline leaves also palmatipartite, with linear lobes; fruitlets glabrous or pubescent.

Series 1. *Pedatifidi* Ovcz. — Radical leaves multipartite, if tripartite then the segments deeply palmatifid or palmatipartite; fruitlets glabrous or pubescent.

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29. *R. affinis* R. Br. in Suppl. append. Parry's Voyage, I (1824) CCLXV; Schlecht. in Linnaea VI, 577; Ldb., Fl. Ross. I, 37 ex pte; Kryl., Fl. Zap. Sib. V, 1199. — *R. pedatifidus* Schlecht., Animadv. in Ranuncul. II (1820) 18 (excl. syn. DC.); Kom., Fl. Kamch. II, 146 (non Smith). — Ic.: Hook., Fl. bor.-amer. I, (1833), tab. 6, f. A- α (excl. β).

Perennial, 7-30(-34) cm high; roots slender, grayish brown, slightly branched; radical leaves long-petioled, glabrous or with scattered hairs, broadly triangular-ovate or rounded-ovate in outline, with notched or more or less cuneate base, tripartite almost to base, the segments palmately parted to middle or above into 7(8) mostly linear-lanceolate or lanceolate-entire or partially incised-dentate lobes, the middle lobe longer and broader than the rest; cauline leaves 2-4, sessile, glabrous or with scattered hairs (lowermost leaf sometimes petiolate), 4-7-palmatipartite to base, with entire linear or lanceolate sometimes incised-dentate lobes; stems one to several, slender, erect, sulcate, glabrous or with scattered slender flexuous hairs throughout, simple, rarely slightly branched, with 1 or 2, rarely more flowers, often with dark brown fibers of dead petioles at base; peduncles sulcate, glabrous or with scattered hairs; flowers 1.2-2(2.5) cm in diameter; petals mostly 5, rounded-obovate, 6-10 mm long; sepals drooping, rounded-elliptic or ovate, 6-7 mm long, with whitish or yellowish-whitish hairs, rarely glabrate; fruiting head ovoid or ovoid-oblong; receptacle hairy, oblong-cylindric in fruit; fruitlets 2-2.3 mm long, obovoid or oblong obovoid, laterally somewhat convex, glabrous (var. *leiocarpa* Trautv.) or with scattered short hairs; beak 0.3-0.5 mm long, basally oblique with hamate tip. July-August.

Dry slopes and gravelly or stony shores in the polar-Arctic zone. — Arctic: Arc. Eur., Nov. Z., Arc. Sib., Chuk., An.; E. Siberia: Lena-Kol.? Far East: Kamch. Gen. distr.: Arctic, Ber. Described from Arctic America.

30. *R. pedatifidus* Sm. in Rees, Cyclop. XXIX (1818) No. 72; DC., Syst. Veg. I (1818) 275; Ldb., Fl. Ross. I (1842) 732. — *R. amoenus* Ldb., Fl. Alt. II, (1830) 32; Kryl., Fl. Zap. Sib. V, 1198. — *R. affinis* Ldb., Fl. Ross. I, (1842) 37 ex pte. — Ic.: Ldb., Ic. Pl. Fl. Ross. II, (1830), tab. 113 (sub nom. *R. amoenus*).

Perennial, 7–20 cm high; stem usually one, with a bundle of slender cordlike fibers, erect, sulcate, often somewhat curved above, densely covered throughout with obliquely divergent or drooping soft broken long white sometimes tangled hairs, simple or slightly branched, with one or few flowers; radical leaves long-petioled, with scattered long weak hairs, the blade more or less ovate or broad-ovate in outline, usually somewhat cordately notched, mostly deeply 7–15-pedatipartite, with linear-lanceolate or lanceolate unequally 2–3-incised-dentate lobes, the middle lobe more or less deeply incised into distant lobules or else the blade distinctly tripartite for more than half its length, with the middle part narrower and long, broadly cuneate-oblong, mostly trifid, the lateral parts broad, shallowly parted into broadly obtuse 2–3-incised-dentate lobules; cauline leaves 3–5-palmatipartite almost to base, with elongate linear or linear-lanceolate entire or slightly incised-dentate lobes, sessile, with a short broad sheath; peduncles more or less densely appressed-hairy, finely (proximally conspicuously) sulcate; flowers 2–2.5 cm in diameter; petals 5–7, obovate, cuneate, slightly crenulate proximally; sepals 5, ovate, obtuse, with white scarious margin, covered with more or less long downy hairs, half as long as petals; receptacle cylindric, with short hairs; fruiting head more or less ovoid-oblong; fruitlets 2(2.5) mm long, rounded-ovoid, slightly convex, with short hairs, rarely glabrous; beak a very short, hamately curved or straight, apically bent, slightly subacutely bordered along ventral suture. June–July.

Rocks, dry slopes, occasionally solonchic meadows, mainly in the sub-alpine zone. — W. Siberia: Alt., Dzu.-Tarb. **Gen. distr.:** Mong. (Alt.). Described from Altai. Type in London.

31. *R. rigescens* Turcz. in Sched.; in Not. syst. VII (1937).

Perennial, 10–19 cm high; roots fiberlike-cordlike, fascicular; radical leaves long-petioled, the petioles glabrous or with scattered long weak flexuous hairs, the blade dimorphic: in some leaves somewhat ovate-rounded, entire, cordate, the whole margin deeply rounded-incised-dentate, the middle tooth larger, ovate-oblong, entire or with 3 minute teeth; other leaves deeply palmatipartite, with more or less broad-lanceolate entire, sometimes 1–2-toothed lobes, the middle lobe longer, leaf blade glabrate, rigidulous; cauline leaves sessile, 3–5-palmatipartite, almost to base, with lanceolate or linear almost always entire lobes; stems canaliculate throughout, slightly hairy or glabrate, 1–3-flowered, usually branched distally, with long erect slightly sulcate peduncles, appressed-hairy in fruit; flowers small, pale yellow, 0.8–1.5 cm in diameter; petals 5, obovate, undulate-crenate, rarely almost incised; sepals ovate, whitish-bordered, more or less appressed-hairy; receptacle elongated, shortly pubescent; fruiting head oblong; fruitlets small, 1.5 mm long, especially when immature covered with a fine down, orbicular or obovate-rounded, with somewhat convex sides, the beak carinate especially dorsally with a hamate tip. June.

Meadows in river valleys and deep narrow gullies, solonchek places, pebbly river beds, and occasionally in open broadleaf forests. — E. Siberia: Ang.-Say., Dau. **Gen. distr.:** Mong. Described from the Irkutsk area. Type in Leningrad.

Series 2. **Polyrhizi** Ovcz. — Radical leaves rounded-reniform [in outline], deeply tripartite or trisected into dentate or lobate or entire cuneate segments; fruitlets pubescent; roots cordlike, somewhat thickened.

32. **R. polyrhizus** Steph. in Willd., Sp. pl. II (1799) 1324; Ldb., Fl. Ross. I, 39; Shmal'g., Fl. I, 20; Kryl., Fl. Zap. Sib. V, 1202. — Ic.: M.B., Pl. rar. Ross. I (1810), tab. 19; Deless., Icon. pl. sel. I (1820) tab. 38. — Exs.: HFE No. 801.

Perennial, 8–17 cm high, glabrous, with numerous thickened cordlike bundles of fibers; stems usually one, sometimes 2 or 3, erect or somewhat ascending, weak, distally branched, with slender curved more or less spreading branches, mostly 2–5-flowered; radical leaves petiolate, the blade more or less reniform or rounded-reniform in outline, deeply tripartite or trisected and then the segments, especially the middle one, more or less tapering to a petiolelike base, the middle segment oblong-obovate, cuneate, with 3 rounded apical teeth or small lobes, sometimes the middle segment entire and then the middle tooth (or lobe) larger, the lateral segments broader than the middle one, bifid, with entire obtuse, often rounded-dentate lobes; cauline leaves at the base of peduncles deeply 3–4-palmately-partite with entire-oblong or lanceolate lobes; bracts sessile, 2–3-partite, with linear lobes; peduncles finely sulcate, often divaricate, in groups of 2 or 3, glabrous or minutely hairy distally; flowers 1.5–2 cm in diameter; sepals 5, half the length of the petals, more or less broad-ovate, with numerous prominent rather dark longitudinal partly branching veins, glabrous or covered with inconspicuous short hairs, the distal edge whitish or lilac-scarious; petals 5–6, obovate, with prominent veins on both surfaces, the margin rounded, sometimes obscurely crenately notched; fruitlets 2 mm long, laterally convex, more or less obovate or oblong-obovate, covered with a short down with a whitish-scarious border along the keel extending to base and along part of the ventral suture, somewhat diverging from the back, with a more or less distinct faint vein, often flattened basally, inflated higher up; the beak to 0.3 mm, usually curved or straight; receptacle glabrous. April–May.

Depressions in solonchek steppes, sandy chernozem steppes with forb and feathergrass, sometimes abandoned fields, dry gravelly slopes, and in mountains to 800–1,600 m. — European part: M. Dnp.?, V.-Don, Transv., Bl., L. Don, L.V.; Caucasus: Cisc.?, S. Transc. (?); W. Siberia: U. Tob., Irt., Alt.; Centr. Asia: Dzu.-Tarb., T. Sh. **Gen. distr.:** Centr. Eur. (Galicia), Dzu.-Kash. (Kuldja). Described from Siberia. Type in Berlin.

Note. N.A. Busch (Fl. cauc. crit. III, 3, p. 133) considers Bieberstein's record of this species for Ciscaucasia (M.B., Fl. taur.-cauc. II, 24; III, 380) erroneous. In my opinion, records of its occurrence in Armenia must likewise be considered erroneous.

33. *R. ussuriensis* Kom. in Not. Syst. H.B.P. VI, 1 (1926) 7. —
R. polyrhizus var. *major* Maxim., Prim. Fl. Amur. (1859) 201. —
R. polyrhizos Kom. in A.H.P. XXII, 1 (1903) 296, non Steph.

Perennial, 18–30 cm high, sometimes smaller (var. *minor* Ovcz.), somewhat fleshy, glabrate, with 1–3 ascending distally branched striated stems; roots in a compact bundle of numerous fibers; radical leaves numerous, long-petioled, the blade reniform in outline, deeply cordate, deeply tripartite or trifid, the lobate-rounded-dentate segments approximate, sometimes distally overlapping, margin scarcely short-ciliate, sometimes with scattered short appressed cilia on both surfaces or else glabrous; cauline leaves sessile, 3–4-partite to base, the segments of lower leaves often petiolulate, all segments cuneate, almost oblong-rhombic or oblong-obtriangular, unequally 3–4-toothed or lobate-cleft, or oblong-lanceolate, entire in the upper leaves; segments of bracts less deeply cleft or entire; peduncles finely sulcate, more or less densely covered with short appressed hairs; flowers mostly 2–4, 1.6–2.2 cm in diameter, yellow; sepals 5, somewhat curved, ovate, acuminate, covered with short white hairs; petals broad-obovate, 1.5 times as long as sepals with somewhat uneven margin; receptacle more or less oval, glabrous; fruiting head ovoid, fruitlets rounded-obovate or orbicular, convex, 1.8–2.1 mm long, covered with a short down, abruptly passing into a 0.3–0.4 mm-long beak, straight from base and then bent in a long hook or even involute, readily drying out and breaking at the tip; fruitlets with a dorsal vein and a narrow sulcate border appearing attenuate at base. May.

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Riparian semishrubs in sandy and silty soil, but mainly in damp mixed and broadleaf forests, forest ravines, and bottoms of river valleys. — Far East: Ze.-Bu., Uss. Gen. distr.: Jap.-Ch. Described from the Far East. Type in Leningrad.

Note. An early spring plant. According to Academician Komarov, it may be a relict of the Tertiary forest flora (Kom., l.c., p.8).

34. *R. lasiocarpus* C.A.M. in Ldb., Fl. Alt. II (1830) 323; Ldb., Fl. Ross. I, 37; Kryl., Fl. Zap. Sib. V (1931), 1197. — Ic.: Ldb., Ic. Pl. Fl. Ross., (1830), tab. 112.

Perennial; 8–20 cm high, with 1 or 2 stems; rootstock thickened, abbreviated, with a bundle of slender little-branched grayish brown fibers; stem simple, rounded, thickened, 1-flowered, glabrous, sulcate; peduncles covered with short appressed yellowish whitish hairs; radical leaves rounded-reniform in outline, long-petioled, glabrous, tripartite, with broadly rounded-cuneate subacutely lobate-cleft, almost petiolulate segments; cauline leaves 2–3, sessile or sometimes the lowermost leaf petiolate similar to the radical, the others deeply palmatipartite almost to base; flowers 1.7–2.3 cm in diameter; sepals 5, ovate, spreading, recurved brownish yellowish or reddish brownish, more or less distinctly striated, shorter than the petals, 6–7(8) mm long, with more or less sparse appressed short whitish hairs; petals 8–14, arranged in 2–3 series, golden yellow, obovate, rounded cuneate, 0.8–1.2 cm long; receptacle densely short-pubescent; ovaries pubescent; fruitlets obliquely rounded-ovoid, 2–2.2 mm long, smooth, somewhat compressed laterally but with convex sides, the dorsal beak straight, slightly bent distally, sometimes laterally convolute,

tapering, the fruitlet with few short hairs along the margins and on the underside. June–July.

Alpine tundras, damp habitats, and alpine meadows on glacial moraines. — W. Siberia: Alt. Endemic. Described from alpine meadows at the upper reaches of the Chegan River in Altai. Type in Leningrad.

Series 3. *Tangutici* Ovcz. — Densely hairy plants; radical leaves, or at least some of them, cuneate, deeply divided into lanceolate lobes, or dentate.

35. *R. brotherusii* Freyn in Bull. Herb. Boiss. VI (1898) 885; O. et B. Fedtsch. in Engl. Bot. Jahrb. XXVII, 417. — *R. irenchabirgae* Rgl. in herb. — *R. affinis* O. et B. Fedtsch., Conspect. Fl. Turk. I (1906) 12, non *R. Br.*

393 Perennial, small, 3–7(10) cm high, forming small mats, with a bundle of slender threadlike distally, slightly thickened root fibers; stems slender, mostly 1 or 2-flowered, densely covered throughout with semiappressed, distally with appressed white rigid hairs; radical leaves long-petioled, with scattered short white appressed hairs, deeply tripartite, the segments sessile, oblong-ovate in the lower leaves, oblong-cuneate in the upper, their apices either entire obtuse or more or less deeply 2–4-incised-dentate; cauline leaves small, sessile, the lowermost rarely short-petioled, 2–4-partite, with subacute oblong-linear hairy lobes; flowers small, 8–12 mm in diameter; sepals spreading, yellowish green, hairy, oblong-elliptic, 3–6 mm long; petals 5, to 5–7 mm long, oblong-obovate, tapering to a tubular claw; receptacle glabrous, the perianth often persistent in fruit; fruiting head oblong-ovoid; fruitlets (immature!) convex-rounded-ovoid; beak slender, straight, glabrous, not more than 1.2–1.5 mm long, with hamate tip. June–July. (Plate XXIV, Figure 4).

Alpine meadows and stony fields above 3,000 m. — Centr. Asia: T. Sh. (mainly eastern half). *Gen. distr.*: Dzu.-Kash. (Chinese part of Tien Shan). Described from the Naryn River valley in the Terskei Ala Tau Range in Tien Shan.

Note. This species is closely related to the Middle Asian *R. tangu-ticus* Ovcz., from which it is clearly distinguished by its less divided leaves with sessile segments, smaller growth, glabrous receptacle, and compact fruiting head. It is remote from *R. affinis*, with which it has been identified by some authors.

36. *R. popovii* Ovcz., sp. nova in Addenda VI, p. 570.

Perennial, 4–6 cm high, with 2–4 or more stems, with 4 to many flowers; stems divaricate from base, branching, densely covered with semiappressed subtomentose soft hairs, with a thickened crown and with a bundle of long somewhat cordlike-thickened roots; radical leaves petiolate, with an elongated whitish hairy sheath, oblong or spatulate-cuneate, trilobate-dentate-cleft with a larger middle tooth or the blade cuneate-ovate, deeply 3–5(6)-parted into oblong-lanceolate entire or — especially the lateral parts — deeply bifid lobes, the blade remotely short-hairy, glaucescent; the lowermost cauline leaves petiolate, similar to the radical, the upper sessile, parted almost to base into 3–4 elongate

394 linear-oblong or linear lobes; peduncles, especially their branches, converging in fruit, densely covered with short hairs; flowers light yellow, 0.8–1.4 cm in diameter; sepals slightly shorter than petals, ovate, densely hairy, with a whitish yellowish border, 4–5 mm long, often persistent in fruit, as are (to some extent) the petals; petals 5, more or less oblong-obovate, 6–8 mm long, tapering to a conspicuous claw; fruiting head oblong-ovoid, compact with numerous partly abortive fruitlets; receptacle oblong, with short hairs; fruitlets to 1.2–1.8 mm long, ovoid-rounded, convex, with scattered short hairs at the sides, slightly carinate, the beak short, straight, with a somewhat bent tip. June–July. (Plate XXIV, Figure 5).

Dry slopes. — Centr. Asia: T. Sh. (E.). Gen. distr.: Dzu.-Kash. Described from the Sarykol'skii Range in Kashgaria. Type in Leningrad.

37. *R. pamiri* Korsh. in Bull. Acad. Pétersb. 5 sér. IX, No. 5 (1898) 400; O. et B. Fedtsch. in Engl. Bot. Jahrb. XXVII (1900) 415. — Ic.: Korsh., l. c., tab. II, f. 8.

Perennial, 7–14 cm high; roots slender, cordlike, in a compact bundle; stems strict, glabrous or with isolated weak white hairs, simple and 1-flowered or else 1- or 2-branched and 3-flowered; radical leaves somewhat coriaceous, petiolate, glabrous, ovate-elliptic or broad-ovate, broadly cuneate, dimorphic: some unequally lobate-partite almost to base into entire or somewhat dentate lobes with the larger middle lobe entire and apically rounded, other leaves trifid, with an entire oblong to almost obovate middle lobe and broad lateral lobes, these 3–4-lobate-cleft, with marginal teeth gradually diminishing in size toward the denticulate base, all teeth or lobes orbicular, obtuse; cauline leaves 1 or 2, sessile, with elongated semiamplexicaul ciliolate sheaths with broad white-scarious edges, tripartite to base or almost to base, lobes not entire, sometimes partly cleft, unequal, narrow-lanceolate; peduncles more or less elongated, strong, with appressed short and slender white hairs, sulcate; flowers 1.9–2.3 cm in diameter; petals 5 or 6, broad-obovate, 9–10 mm long; sepals with appressed white hairs, reddish with a white-scarious border, revolute, to 6 mm long; receptacle conical, glabrous; pistils glabrous, with a short somewhat bent beak (mature fruits not seen); petals with a basal nectariferous gland in a short distally flattened saccule without excrescences. August.

The indigenous (classical) habitat of this plant is the boggy grass plots around Lake Sasyk-kul' in the Pamir. Type in Leningrad.

397 Note. As no fruits have been seen, the systematic status of this species remains unclear. However, the leaves indicate that it is probably related to the series *Pedatifidae*.

Cycle 5. *Nivales* Ovcz. — Radical leaves glabrous, reniform, rounded-reniform, ovate, or cuneate-ovate, 3–5-fid for less than half or for half their length, rarely for more than half their length, or 3–5-toothed; sepals with dark grayish brown, rufous, or golden hairs, rarely glabrous or with whitish hairs (*R. pauperculus* Ovcz.); fruitlets glabrous.



PLATE XXV. 1 - *Ranunculus rufosepalus* Franch., a) fruiting head, b) fruitlet, c) stamen;
2 - *R. rubrocalyx* Rgl., a) stamen, b) fruitlet; 3 - *R. trautvetterianus* Rgl., a) stamen, b) fruitlet;
4 - *R. songaricus* Schrenk, a) fruitlet, b) stamen.

Series 1. *Nivales* Ovcz. — Radical leaves basally notched; sepals with dark grayish brown or golden hairs, occasionally glabrous.

38. *R. nivalis* L., Sp. pl., (1753) 553; DC., Prodr. I, 35, non Gun. (excl. var. *sulphureus*); Ldb., Fl. Ross., I, 36. — Exs.: Herb. norm. edit. ab J. Dörfler, No. 4808; Pl. Finl. exsicc., No. 600.

Perennial, to 4-(7)-16 cm, in fruit to 20 cm high; rootstock slender, abbreviated, with a bundle of slender whitish fibers; stem simple, 1-flowered, single, rarely 2 or 3, more or less curved, with scattered black-brown hairs at the very tip, sometimes also next to the cauline leaves, otherwise glabrous; radical leaves one, rarely several, petiolate, glabrous, small, to 2-6 cm long, 1.8-2.5 cm broad, the blade thin, reniform in outline, cleft almost to base or for half its length into 3 or 5 ovate, obovate, or oblong-ovate entire or obtusely 1-2-toothed distally tapering subobtuse segments; cauline leaves 1-3, thin, glabrous, sessile, with a short amplexicaul sheath, the lower sometimes similar to the radical but usually like the upper, deeply 3(5)-lobate-partite, generally with oblong medially somewhat broadened subobtuse lobes, sometimes the lobes with 1-2 rounded teeth; flowers 1.3-2 cm in diameter; sepals ovate or rounded-elliptic, 6-9 mm long, more or less distant, densely covered with black-brown or dark brown hairs; petals 5, yellow, obovate, cuneate, apically rounded, 10-11 mm long; receptacle glabrous, elongated; fruiting head oblong-elliptic, compact; fruitlets glabrous, ovoid, the beak — about as long as the ripe ovary — straight, tapering toward apex with somewhat bent tip. June-August.

Boggy tundras, damp places, riverbanks, and shaded slopes. — Arctic: Arc. Eur., Nov. Z., Arc. Sib., Chuk., An.; European part: Kar.-Lap. Gen. distr.: Arc., Scand., Ber. Described from Norwegian Lapland. Type in London.

398 Note. The typical *R. nivalis* does not occur in Kamchatka; however, another species grows there and is distinguished by the dentate orbicular blade of its radical leaves, by its stronger growth, and by its larger flowers with often emarginate petals — characters which bring it close to *R. altaicus* Laxm.

39. *R. eschscholtzii* Schlecht., Animadv. Ranunc., (1820) 16; Ldb., Fl. Ross. I, 37; Kom., Fl. Kamch. II, 140. — Ic.: Schlecht., l.c., tab. 1.

Perennial, 7-23 cm high, with 1-3 stems and a short poorly developed oblique rootstock bearing slender roots, rootstock distally concealed by dark grayish brown almost black remnants of leaves; radical leaves long-petioled, glabrous, ciliate only at the margin, rounded-reniform in outline, cordate, tripartite for more than half their length, their segments cuneate from middle to base, the middle one obovate, trilobate-cleft, with obtuse or subacute lobes, the lateral considerably broader, subacutely multilobate-cleft, with lobes gradually diminishing basipetally, becoming dentiform at the very base; cauline leaves 2 or 3, the lower short-petioled or subsessile, the upper sessile, sometimes 2 leaves closely approached, broadly semiobovate, 3-5-partite almost to base, the segments more or less cuneate, lobate-cleft or dentate in uppermost leaves subentire; peduncles scarcely sulcate, glabrous or glabrate, usually with an appressed lobate-partite sessile bract, elongated in fruit; receptacle oblong-elliptic with isolated

erect hairs at the very apex; flowers 1.8 cm in diameter; sepals spreading, navicularly, more or less obovate, with scattered rufous subappressed hairs; petals 5, golden yellow, broad-obovate, crenate, usually longer than the sepals; fruiting head compact, oblong-ovoid or cylindric; fruitlets small, total length to 2.1–2.3(2.5) mm long, convex, smooth, glabrous, the beak dorsal, elongated, sharply defined, to 0.5–0.7 mm long, laterally inclined, straight from base, tip bent or straight (due to drying).

Arctic: Chuk., Komandorskie Islands. Gen. distr.: Ber., N. Am. (in mountains as far south as California and Colorado). Described from Unalaska Island. Type in Berlin; cotype in Leningrad.

40. *R. pauperculus* Ovcz., sp. nova in Addenda VI, p. 571. — *R. eschscholtzii* var. *asiaticus* Kom. in Fl. Kamch. II (1929) 140.

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Perennial, small, 7–15 cm high, with 1 or 2 stems, glabrous, with a short oblique rootstock bearing a dense bundle of elongated roots, distally with black-brown leaf remnants; radical leaves glabrous, more or less cordate, with slender petioles gradually broadening to a glabrous scarious sheath, the leaf blade reniform-rounded in outline, 1–1.3 cm long, 1.5–2.1 cm broad, slender, glabrous, sometimes with semiappressed sparse marginal hairs; deeply tripartite, the middle segment oblong-obovate, entire, rounded, rarely with 2 small teeth at distal margin, the lateral segments much broader, unequally obovate, 2–4-lobate-cleft or obtusely lobate-dentate-cleft, cauline leaves almost always sessile, deeply trilobate-cleft, the segments entire, more or less lanceolate, sometimes somewhat cleft, the upper bracts 2–3-fid into entire lobes; peduncles glabrous, slender, weak, scarcely sulcate; receptacle glabrous, cylindric; flowers small, 1.3–1.5 cm in diameter; sepals ovate, obtuse, with a narrow scarious often lilac border, glabrous or with sparse rufous hairs, shorter than, sometimes as long as petals; petals obovate; fruiting head oval-cylindric, 7 mm long, 3.5–4 mm in diameter; fruitlets small, 2 mm long together with beak, obovate, smooth, glabrous, with convex sides, sharply set off from the beak, the latter slender, almost piliform, straight and then 1 mm long or hamately curved from the middle. July–August.

Alpine meadows and beside rivulets. — Far East: Kamch. (including Karaginskii Island). Endemic. Described from Kamchatka. Type in Leningrad.

Note. This species appears to be an impoverished form of *R. eschscholtzii* to which it is certainly related. However, the mostly glabrous smaller sepals, the entire middle segment of the radical leaves (in *R. eschscholtzii* this is trilobate-cleft), the longer beak of the small fruitlets, and the general appearance of the plant compel us to regard it as a separate species.

Series 2. *Sulphurei* Ovcz. — Leaves cuneate; sepals with rusty brown or rufous hairs.

41. *R. sulphureus* Soland. in Phipps, Voyage au pôle bor., (1775) 206. — *R. nivalis* var. *sulphureus* Wahlenb., Fl. lapp. (1812) 157; Ldb., Fl. Ross. I, 37.

400 Perennial, 3-15(25) cm high, with 1 or 2 stems; rootstock dark brown, somewhat creeping, with numerous slender threadlike whitish fibrous roots; stem somewhat thickened proximally by dark brown or almost black sheaths of radical leaves, glabrate beneath, with scattered more or less appressed flexuous reddish brown slender hairs above, simple, with one rarely 2 flowers; radical leaves long-petioled, the petioles slender, with scattered brownish hairs, the blade more or less spatulate, 1-2(3.5) cm broad, 1-1.5(3) cm long, 3-to multifid, with more or less broad-oblong mostly subobtusely rounded lobes, mostly more or less cuneate, glabrous or with sparse brownish hairs along the margins; cauline leaves broadly obtriangular or broadly cuneate, mostly 3(5)-partite, with oblong lobes, sessile, with brownish-haired sheaths, sometimes the blade remotely hairy; flowers single, terminal, rarely 2, large, 1.6-2.5 cm in diameter; sepals 5, ovate, concave, 6-9(10) mm long, densely covered with reddish or dark grayish brown hairs; petals 5-6, rarely more, 8-13 mm long, broadly rounded-ovate, rounded at the apex, bright yellow; receptacle thickened, oblong-conical, densely covered with dark grayish brown hairs; fruiting head oblong-ovate; fruitlets smooth, 2-2.5 mm long, rounded-obovate, beak strict, 1-1.5 mm long with hamate tip, more or less compressed laterally, their margins sharp, with a row of longitudinal folds or veins. June-August.

Bog tundras, shallows, and banks of rivulets in the polar-Arctic zone. - Arctic: Arc. Eur.; Nov. Z., Arc. Sib., Chuk., An.? Gen. distr.: Arc., Scand., Ber. Described from Arctic Europe. Type in Paris.

42. *R. altaicus* Laxm. in Novi, Comm. Acad. Petr. XVIII, (1773) 533; C.A.M. in Ldb., Fl. Alt. II, 325; Ldb., Fl. Ross. I, 37; Kryl., Fl. Zap. Sib. V, 1196. - *R. frigidus* Willd., Sp. pl., II, 2 (1799) 1312. - *R. frigidus* DC., Prodr. I, (1824), 35 expte (non Willd.). - *R. sibiricus* Adams in Nuov. Mém. Soc. Nat. Mosc. III, (1834) 246. - *R. sulphureus* var. *altaica* Trautv. in Bull. Soc. Nat. Mosc. XXXIII, 1, (1860) 69. - *R. nivalis* var. *tianschanicus* Rupr. in Mém. Acad. Pétersb. XIV, (1869) 37. - Ic.: Laxm., l.c., tab. VIII.

401 Perennial, (3)6-18(30) cm high, with 1-3, rarely many stems; rootstock short, dark brown, almost black, thickened, with numerous threadlike fibers; stem somewhat thickened proximally by light brown thin sheaths of radical leaves, glabrous or with more or less appressed slender grayish brown hairs confined to upper part, mostly simple, 1-flowered; radical leaves numerous, long-petioled, the blade broadly cuneate or cuneate-rounded, 1.5-3.5(4) cm long, 1-3.5 cm broad, with 3-5 or more large toothlike incisions at apex, glabrous or with brownish, marginal hairs, especially beneath; cauline leaves 2 or 3, broadly cuneate in outline, sessile, with broad sheath, distant, 5-6 times deeply dissected into oblong often palmatisect entire lobes, glabrous or with brownish hairs scattered along the margins; flowers more or less large, 2.2-3.7 cm in diameter, golden yellow, glossy; sepals 8-13 mm long, ovate, somewhat concave, with brownish rufous or dark brown hairs beneath; petals mostly 6-10, 10-16 mm long, broadly rounded-obcordate, distal margin uneven, mostly somewhat emarginate; receptacle broadly short-oblong, covered with short brownish hairs; fruiting head broad-ovoid or more or less orbicular;

fruitlets obliquely ovoid, slightly compressed, with sharp margins, smooth, ca. 2.5–3 mm long, with a longish, ca. 1 mm long, straight, distally recurved beak. June–August.

Alpine zone: bald mountains, moist slopes, moraines, near glaciers and thawing firn, moss-and-lichen tundras, rarely gravel-and-lichen tundras, and alpine meadows at 1,400–2,900 m. — W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau.; Far East: Kamch.? Centr. Asia: Dzu.-Tarb., T. Sh. **Gen. distr.:** Dzu.-Kash., Mong. Described from Altai.

Note. The Tien Shan (Trans-Ili Ala Tau) plants are distinguished by their smaller flowers, petals notched, not emarginate, with crimped margin, the almost black sheaths of dead leaves producing a kind of calypre, covering the base of the plant. This form should possibly be separated as a distinct species, *R. transiliensis* M. Pop. sp. n. (a type *floribus minoribus et petalis apice integerrimis flexuosisque et vaginis foliorum emortuorum atrofusis differt*), originally described by Ruprecht under the name *R. nivalis* β *tianschanicus*.

Series 3. **Fraterni** Ovcz. — Leaves entire, tripartite, crenate or dentate, basally rounded or narrowly notched; sepals covered with whitish or dull hairs.

43. **R. alberti** Rgl. et Schmalh. in A. H. P. V (1877) 223. — *R. sulphureus* var. *alberti* Maxim., Enum. pl. Mongol., (1889) 19; O. et B. Fedcz., Consp. Fl. Turk. I, (1906) 11.

Perennial, 8–20 cm high; rootstock abbreviated, stems ascending, weak, or more or less erect, glabrous, with short appressed ciliate scattered hairs confined to the very tip, simple and 1-flowered or 2 or 3-flowered and with 1 or 2 short lateral branches; radical leaves mostly numerous, petiolate, with a thin scarious broadened sheath, more or less expanded, glabrous or with somewhat distant short white ciliate hairs, the blade rounded-reniform in outline, dark green, somewhat lustrous, smooth, mostly curved, with retrorse broadly and obtusely rounded-dentate margins, margins glabrous or ciliate-hairy; upper cauline leaves sessile, 5–7-palmatisect almost to base, their lobes short-ciliate-margined, lanceolate-oblong, very slightly acuminate or obtuse; all veins prominent; flowers 1–1.5(2) cm in diameter, yellow; petals 5, broad-obovate, slightly emarginate or acuminate, one-third longer than the sepals; the sepals navicular, dorsally convexly appressed to petals, covered with short hairs, proximally reniform, receptacle short-oblong, with very short slender whitish hairs; fruitlets 1.5–1.8 mm long, rounded-ovate, more or less convex, the short beak somewhat displaced, straight, slightly curved distally. June–August.

Alpine and subalpine meadows, alpine stone fields, gravelly-sandy slopes; locally descending to the upper forest zone, where it grows in peaty and damp soil at 2,400–4,300 m. — Centr. Asia: Dzu.-Tarb., Pam.-Al., T. Sh. **Gen. distr.:** Dzu.-Kash., Mong. (mountainous northwestern part). Described from Tien Shan (Karakol). Type in Leningrad.

44. **R. fraternus** Schrenk in Fisch. et Mey., Enum. pl. novar. a cl. Schrenk lectarum I (1841) 103; Ldb., Fl. Ross. I, 731. — *R. altaicus* var. *fraternus* Trautv. in Bull. Soc. Mosc. I, (1860) 70.

Perennial, 10–15 cm high, with one stem; rootstock almost obsolete, with a bundle of long branching fiberlike roots; stems proximally thickened by a more or less compact envelope of dark gray, almost black dead sheaths, glabrous, with more or less appressed short curved dull or light brownish hairs at the very tip, simple, with one flower; radical leaves more or less long-petioled, the petioles somewhat flattened, glabrous, the blade rather coarse, rigid, ovate, teeth with somewhat callous apex and evenly spaced almost to base; cauline leaves sessile, with amplexicaul sheaths, palmatifid or palmatifid, mostly extended, glabrous, the margins sometimes minutely and irregularly ciliolate, the lobes almost linear-oblong, entire; sepals 8–13(14) mm long, more or less obovate or elliptic-ovate, strongly curved, brownish, densely covered with short whitish-brownish more or less appressed hairs; petals 8–11, 11–15 mm long, elongate-cuneate, rounded, rarely very slightly emarginate; flowers 1.8–2.5 cm in diameter, golden; receptacle glabrous; fruitlets glabrous, more or less ovoid, beak straight, with a curved tip. June–July.

Alpine stone fields and meadows and near mountain streams at 2,100–3,300 m. — Centr. Asia: Dzu.-Tarb., T. Sh. Gen. distr.: Dzu.-Kash. Described from the Dzungarian Ala Tau. Type in Leningrad.

Series 4. *Songorici Ovcz.* — Sepals covered with white or dull hairs; fruitlets glabrous; radical leaves mostly tripartite to base, with cuneate incised-dentate segments; lobes of cauline leaves usually linear-lanceolate, dentate.

45. *R. songoricus* Schrenk in Fisch. et Mey., Enm. pl. nov. a cl. Schrenk, lect. II, (1842) 67. — *R. villarsii* Kar. et Kir in Bull. Soc. Nat. Mosc. I, (1842), 133, non DC.

403 Perennial, 20–35(40) cm high; rootstock more or less stout, oblique, roots fascicular, fiberlike, long, slenderly branching at apex, filiform; stem branched from lower part, erect or spreading from base, the branches elongated, simple or with 1 very elongated lateral branch, glabrous or upper part only of peduncles slightly short-appressed-hairy; leaves glabrous, especially the cauline leaves ciliolate-margined; radical leaves cordate-suborbicular, tripartite to base or almost to base, with broadly cuneate segments, the middle segment sometimes ovate, sometimes subpetiolate, mostly the segments 3–5-sect for half their length, their lobes, especially the middle lobe, entire or — especially the lateral lobes — slightly dentate, the lateral lobes 2–3-incised-dentate with acute teeth, sometimes the leaves tripartite with ovate, apically tripartite-dentate segments; lower cauline leaves similar to the radical, with somewhat broadened sheath, the upper cauline leaves 3–5-sect, the uppermost 1–3-sect, leaf segments linear or linear-oblong, acuminate; peduncles slightly sulcate; flowers to 1.8–2.2(2.5) cm in diameter, pale yellow (?); sepals curved, spreading, nutant, with dull whitish hairs on the outside, to 6–7 mm long, elliptic or irregularly elliptic; petals 5–8, broad-obovate, apically rounded, rarely subobtusate, sessile, cuneate, 8–13 mm long; sepals and petals long-persistent in fruit; fruitlets 2 mm long, ovoid, convex, glabrous, smooth, almost carinate-margined, with a border, the beak very short, ensiform,

apically curved-acuminate, the margin with short transverse veins; receptacle oblong, with short white appressed hairs; fruiting head ovoid. June. (Plate XXV, Figure 4, a-b).

Subalpine and alpine meadows and stone fields at 2,100–2,700 m. — Centr. Asia: Dzu.-Tarb., T. Sh. **Gen. distr.:** Dzu.-Kash. (Kuldja). Described from Tarbagatai. Type in Leningrad.

46. *R. trautvetterianus* Rgl., nomen. — *R. songoricus* v. *partitus* Rupr. in Ost.-Sak. et Rupr., Sert. tiansch. (1869) 37. — *R. songoricus* auct. Fl. As. Mediae, ex pte.

Perennial, 12–25(30) cm high; stems several or many, mostly branched, semiascending, glabrous or with scattered appressed hairs confined to the very tip, basally thickened and covered with broad sheaths of old leaves; radical leaves reniform-rounded in outline, tripartite for half or less than half their length, the segments broad obovate obtusely rounded, incised-dentate; cauline leaves 2 or 3, sessile, deeply 3–4-partite, with oblong or linear-oblong elongate lobes, sometimes with ciliolate hairs along the margins; flowers few, to 1.5–2 cm in diameter; sepals spreading, elliptic or ovate, to 6–8 mm long, with scattered whitish-dull hairs, often somewhat reddish or brownish; petals 5–7(8), broad-obovate, cuneate, to 8–10 mm long; receptacle glabrate; fruiting head short-ovoid; fruitlets 1.5–2 mm long, glabrous, smooth, slightly bordered, obliquely obovoid, with a short somewhat curved lateral beak. June–August. (Plate XXV, Figure 3, a-b).

Damp subalpine and alpine meadows. — Centr. Asia: Pam.-Al., T. Sh. **Gen. distr.:** Dzu.-Kash. Described from the Trans-Ili Ala Tau. Type in Leningrad.

47. *R. rubrocalyx* Rgl. ex Kom. in Trav. Soc. Nat. Petersb. XXVI, (1896) 62. — *R. rufosepalus* var. *parviflorus* Kom., l.c., p. 62. — *R. songoricus* Kom. (non Schrenk.), l.c., p. 64, ex pte. — *R. rufosepalus* f. *intermedia* Lipsky in herb.

Perennial, 7–20(23) cm high, with 1, few, rarely many stems, forming small loose mats; stems ascending, simple or slightly branched, glabrous, with sparse appressed hairs confined to the tip, basally thickened by old leaf sheaths; radical leaves petiolate, tripartite to base (var. *typicus* Rgl.) or 3- to many-lobed (var. *lobatus* Rgl.), their segments sessile, cuneate, acutely incised-dentate or more or less subacutely lobate, the lobes ovate-oblong, subacute, rarely very slightly obtuse, entire or broadly and remotely dentate; cauline leaves, sessile, palmatipartite, with subacute linear entire or incised-dentate lobes; flowers 15–17 mm in diameter; sepals ovate, dark red, with short appressed white hairs, to 9–9.5 mm long; petals short, often as long as or even shorter than sepals, obovate, 8–9 mm long; fruiting head subglobose or ovoid-rounded; fruitlets 1.5–2 mm long, glabrous, more or less elliptic-obovoid, the beak slender, short, somewhat declinate, with hamate tip. June–August. (Plate XXV, Figure 2, a-b).

Alpine damp meadows with low herbaceous cover, rarely in stone fields, at 3,000–4,000 m. — Centr. Asia: Pam.-Al., T. Sh. Endemic. Described from the Zeravshan River basin. Type in Leningrad.

Note. In the Fergana-Alai part of its range this species is distinguished by its large flowers, to 2–2.5 cm in diameter.

Series 5. *Pygmaei* Ovcz. — Sepals declinate or spreading, with a whitish down. Plants to 5–9(11) cm high, with 1 stem and with small, to 6–13 mm broad, deeply divided leaves.

48. *R. pygmaeus* Wahlb., Fl. Lappon., (1812) 157; Ldb., Fl. Ross, I, 36; Kryl., Fl. Zap. Sib. V, 1195. — Ic.: Wahlb., l. c., tab. 8, f. 1.

405 Perennial, 3–5 cm high, mostly 1-stemmed, 1-flowered, with vertical abbreviated rootstock concealed by a bundle of slender filiform roots, with black to grayish brown remnants of old leaves above; stem curved, spreading or erect, with more or less distant fine whitish hairs; leaves glabrous or with sparse long hairs along the margins, the lower leaves petiolate, subreniform, small, the blade to 4–10 mm long. 6–13 mm broad, parted to half or two-thirds or three-fourths of its length into 3–5 obovate entire, rarely somewhat obtusely dentate lobes; cauline leaves mostly 1, short-petioled, tripartite, with narrower lobes; peduncles finely sulcate, appressed-hairy; flowers 7–11 mm in diameter; sepals 5, ovate, declinate, with a short whitish down, 4–5 mm long; petals 5, about as long as petals, obovate, with short claw; receptacle elongated, slender-cylindric, glabrous; fruitlets small, 1–1.2 mm long, oblong-elliptic, glabrous, smooth, convex, beak straight, slender, 0.2–0.3 mm long with bent tip. July–August.

Argillaceous slopes, gravels, argillaceous tundra, banks of rivulets in the polar-Arctic zone, and balds in the alpine zone of mountains. — Arctic: Arc. Eur., Nov. Z., Arc. Sib., Chuk.; Far East: Kamch. Gen. distr.: Arc., Scand., Centr. Eur. Described from Lapland.

Note. In Arctic Siberia and Chukotka* there occurs var. *sabinii* (R. Br.) Kurtz. (in Engl. Bot. Jahrb. XIX, 452; Kom., Fl. Kamch. II, 140), distinguished by taller growth and by sepals covered with long white hairs. This may be a separate species (*R. sabinii* R. Br. in Suppl. Append. Parry's Voyage I, 264).

Cycle 6. *Arachnoidei* Ovcz. — Plants covered with arachnoid hairs.

49. *R. arachnoideus* C. A. M. Verz., Pflz. Cauc., (1831) 201; Ldb., Fl. Ross. I, 39; Boiss., Fl. Or. I, 40; N. Busch in Fl. cauc. crit. III, 3, 172.

406 Perennial, to 4–10 cm high; rootstock abbreviated in upper part, with a bundle of long rather slender cordlike cylindric roots covered with white hairs; radical leaves long-petioled, the petioles often somewhat flexuously curved, glabrate or with scattered tangled arachnoid hairs, the blade almost rounded-cordate in outline, rather thick, rigid, tripartite for half or more than half its length, with obovate apically incised-dentate segments; cauline leaves small, arachnoid-hairy, divided into linear entire or slightly dentate lobes; stems mostly solitary, ascending, often flexuous, especially proximally, covered with arachnoid tangled hairs, rarely glabrous proximally; simple 1-flowered, or else branching distally with 2–5 and often more or less equal peduncles; flowers 1.8–2.4 cm in diameter; sepals distant, arachnoid-hairy; petals obovate, cuneate, crenulate at the apex; receptacle clavately thickened in fruit, with an apical tuft of slender white hairs, otherwise glabrate; fruitlets 3–3.5 mm long, glabrous, smooth, obovate, slightly carinate-bordered; beak 0.5 cm long, almost straight or proximally curved, often considerably displaced in fruit, fruitlets more or less flattened, with somewhat convex sides. July–August.

* [Chukchi National District.]

Rock streams in the alpine zone above 2,700–3,000 m. — Caucasus: Dag., E. Transc. Endemic. Described from Dagestan (Tufan-Dag). Type in Leningrad.

Cycle 7. *Gelidi* Ovcz. — Leaves small, compound, with petiolate deeply incised or parted segments; beak of fruitlets laterally displaced; sepals with white or dull or rufous hairs.

50. *R. gelidus* Kar. et Kir in Bull. Soc. Nat. Mosc. XV, (1842) 133; Ldb., Fl. Ross. I, 733; Trautv. in Bull. Soc. Nat. Mosc. I, (1860) 74.

Perennial, small, mostly 5–10 cm high, glabrous or glabrate; stems ascending, simple, 1–3-flowered, proximally prostrate; roots cordlike; leaves with long flat petioles, glabrous, orbicular, compound, tripartite, their segments short-petioluled, deeply parted, small, broadly orbicular or obovate-cuneate, the middle segment with a longer petiolule, tripartite, with entire or 2–3-lobulate-dentate lobes, the lateral segments often bipartite, their lobes trilobulate, cuneate or similar in shape to the segments; petioles of lowermost leaves with long broad glabrous sheaths; stems flexuous in their lower part which is often hidden under gravel, flattened, sometimes as long as or even shorter than peduncles; peduncles glabrate, with scattered short slender appressed hairs; flower 1.6–2.2 cm in diameter; sepals more or less spreading, broad-ovate, with a broad fringe of sparse short thin appressed hairs; petals broad-obovate, rounded; receptacle slender, apically hairy; fruitlets 2–2.5 mm long, convex, sometimes somewhat compressed below, obovate, with a short down (var. *dasycarpa* Trautv.) or glabrous (var. *leiocarpa* Trautv.), beak 0.5–0.7 mm long, straight, slender, with hamate tip, much displaced laterally, often drying out; surface of fruitlet sometimes with slight wrinkles due to the unequal thickness of epidermal tissues, with a thin narrow whitish scarious sometimes obsolete border. July–August.

Alpine rock streams and stony slopes and patches of thawing snow at 2,100–3,700 m. — Centr. Asia: T. Sh., Dzu.-Tarb. (Dzungarigan Ala Tau). Gen. distr.: Dzu.-Kash. Described from the Dzungarian Ala Tau. Type in Leningrad.

51. *R. rufosepalus* Franch. in Mis. Capus, Plante d. Turk., (1883) 6; Kom. in Trav. Soc. Nat. Pétersb. XXVI, (1896) 62; Fedtsch., Consp. Fl. turk. 1 (1906) 12. — Exs.: H. F. A. M., No. 148a and 148b.

Perennial, to 18 cm high, often forming thin mats; rootstock abbreviated, thickened, more or less oblique, with a row of long cordlike rather slender root fibers; stems glabrous or with scattered reddish brown hairs confined to the very tip, with 1, rarely 2 flowers, ascending, somewhat curved, proximally thickened by abundant dark brown fibrous-scarious remains of dead sheaths sometimes forming a kind of envelope; radical leaves long-petioled with broad sheaths, glabrous, tripartite, with petiolate 4–5-palmately-lobate deeply cleft segments, the terminal lobes mostly orbicular, subobtusely; cauline leaves sessile or lower leaf with an auricled spreading short sheath, all cauline leaves palmatisect, with petiolate segments deeply parted into 3–5 linear lobes; flowers 1.5–2.2 cm in diameter; sepals ovate,

densely covered with reddish brown or rufous hairs on the outside, 5–6 mm long, distant; petals 5, broad-obovate, cuneate, 7–12 mm long, flowers rounded, sometimes with a somewhat uneven margin, golden yellow; receptacle broadened, oblong-elliptic, glabrous or with isolated short grayish brown hairs; fruitlets 2–2.4 mm long, ovoid-rounded, glabrous, somewhat convex, beak laterally displaced, often curved to the side, straight from base, truncate, acuminate, with a somewhat hamate tip, to 1 mm long. June–August. (Plate XXV, Figure 1, a–c).

Damp alpine meadows, alpine stone fields, and patches of snow at 2,500–4,200 m. — Centr. Asia: T. Sh., Pam.-Al. Endemic. Described from Tadzhikistan (basin of the mountain part of the Zeravshan River). Type in Paris.

Note. Fergana-Pamir specimens are distinguished by their small growth and by their less densely hairy perianth.

Subgenus 2. **HECATONIA** (Lour.) Ovcz. — *Hecatonia* Lour., Fl. Coch. I (1793) 370; DC., Syst. I, 227; Spach, Hist. Veg. VII, 198. — Sect. *Hecatonia* Grn. et Godr., Fl. Fr. I, (1848) 38, non Lour.; Rouy et Fouc., Fl. Fr. I, 112. — Sect. *Marsypadenium* subsect. *Epirotes* Prantl in Engl. Bot. Jahrb. IX, (1888) 266–267 ex pte; Ej. in Engl. u. Pr., Pflzfam. III, 2, 64–65 ex pte.

408 Petals mostly 5, small, as long as or slightly longer than sepals; stamens 10–20, rarely more, arranged in 2–3 rows; anthers suborbicular, short; stigmas sessile or subsessile, subulate; fruitlets very numerous (to 70–100), small, in a compact oblong or ovoid-cylindric head, with a very short inconspicuous beak. Annuals or biennials, with small flowers and hollow stems, with a small basal bundle of root fibers. The subgenus ranges from the tropical and subtropical regions of the Old and New Worlds northward to the Temperate Zone; only one very widely distributed species (*R. scleratus*) reaches the northern limits of the taiga.

1. Stems and petioles covered with rigid spreading hairs; fruitlets to 2–3 mm long 54. *R. chinensis* Bge.
- + Stems and petioles glabrous, occasionally with scattered appressed hairs; fruitlets to 1–1.3 mm long 2.
2. Fruitlets rugose or indistinctly alveolate; stalks straight; flowers to 7–10 mm in diameter 52. *R. scleratus* L.
- + Fruitlets smooth; stalks curved, divergent 53. *R. dolosus* Fisch. et Mey.

52. *R. scleratus* L., Sp. pl., (1753), 551, 776; DC., Prodr. I, 34; Ldb., Fl. Ross. I, 45; Shmal'g., Fl. I, 17; Kryl., Fl. Zap. Sib. V, 2008. — Ic.: Rchb., Ic. Fl. Germ. IV, f. 4598; Hegl., III. Fl. II, tab. 119, f. 5.

Biennial or annual, (10)20–45(100) cm high, glabrous, rarely appressed-pubescent; stem more or less straight, hollow like the peduncles, sulcate, branched, rarely small with few flowers (var. *minimus* DC.); leaves somewhat fleshy, tripartite, obtusely cleft, the upper leaves trifid or tripartite with linear or oblong lobes, the uppermost leaves sessile, oblong, incised-dentate or parted; peduncles pubescent, more or less erect; flowers small, to 7–10 mm in diameter; sepals recurved, longer than the petals; petals

5-6, rarely more; receptacle elongate-oblong, with ciliate hairs; fruitlets very numerous, crowded in an oblong-cylindric head, to 1-1.3 mm long, obovate, compressed, with a thin, rufose, obtuse border; beak very short, pointed. April-June.

Damp and muddy localities, banks of rivers, rivulets and lakes, banks of ditches, boggy meadows, and sometimes in damp weedy places. Widely distributed throughout the northern hemisphere with the exception of the Arctic zone, this species ranges in the USSR from Kar.-Lap. and Dv.-Pech. southward to the Caucasus and Crimea, inclusive, and eastward to Siberia (W. and E.), the Far East, and Kamchatka. It is ubiquitous in submontane and lowland areas. Centr. Asia (to Mtn. Turkm.). **Gen. distr.:** throughout Eur., N. Afr., Bal.-As. Min., Arm.-Kurd., Iran, Ind.-Him., Dzu.-Kash., Mong., Jap.-Ch., N. Am. Described from Europe. Type in London.

Economic importance. One of the most poisonous species of *Ranunculus*. Its fresh herbaceous parts cause blisters and irritation of the skin like that which results from burns. The poisonous properties of this species in the USSR are not fully known.

409 53. *R. dolosus* Fisch. et Mey. in Hohenack., Enum. Talysch. (1837) 148; Bull. Soc. Nat. Mosc., (1838), 384; Ldb., Fl. Ross. I, 45; Boiss., Fl. Or. I, 53 N. Busch in Fl. cauc. crit. III, 3, 132.

Annual or biennial, 20-30 cm high, with solitary 2-3-forked glabrous sulcate many-flowered stems, with branches and peduncles arising from leaf axils; the lower and mostly the middle leaves as well reniform-rounded [in outline], trifid into short broad subrhombic obtusely dentate-incised lobes, the upper leaves short-petioled, oblong-elliptic or oblong, with an obtusely dentate margin, rarely entire; peduncles glabrous, sulcate, in fruit curving downward or to the side; flowers very small, 4 mm in diameter; sepals recurved, somewhat longer than petals; receptacle elongated, thickened, ciliate; fruiting head ovoid, 5 mm long; fruitlets numerous, tightly crowded, small, suborbicular or rounded-ovate, smooth, acutely carinate, with a very short straight acuminate somewhat spinous beak. May. (Plate XXIV, Figure 6).

Bogs and boggy localities. - Caucasus: Tal. Endemic. Described from Talysh. Type in Leningrad.

54. *R. chinensis* Bge. in Enum. pl. Chin. bor., (1831), 3; Maxim., Prim. Fl. Amur., 21; Kom., Fl. Manchzh. II, 300. - *R. pensylvanicus* Hook., Fl. Brit. Ind. I, (1875), 19, non L. - *R. pensylvanicus* var. *chinensis* Maxim., Enum. pl. Mong., (1889), 23. - *R. scleratifomis* H. Raikova in Not. Syst. H. B. Petrop. VI, (1923), 171. - Exs.: HFR No. 1355; H. F. A. M., No. 140.

Annual or biennial, 15-45 cm high; stems one or several, erect, hollow, somewhat branched distally, stems and petioles covered with rigid spreading hairs; radical leaves petiolate, tripartite, their segments petiolate, broad-rhombic or oblong-ovate in outline, cuneate, mostly deeply 2-3-fid into serrate-dentate lobes; cauline leaves - all but the uppermost - petiolate, tripartite, with incised-dentate oblong-lanceolate segments; peduncles sulcate, with appressed rigid hairs; flowers 6-9 mm in diameter; fruiting head elongate-oblong or elongate-ellipsoid, compact; fruitlets 2-2.5(3) mm

long, laterally compressed, rounded-elliptic, smooth, with a more or less distinct border, the beak short, sometimes almost obsolete, acuminate, straight, proximally broadened; receptacle oblong-ellipsoid, or more or less cylindric, densely covered with short white hairs. May-July.

Boggy and muddy localities in river valleys, "mochezhiny"* among meadows, rarely in "tugai,"* damp meadows, sand and mud flats near the banks of rivers and lakes, ditches, and sometimes as a weed in damp habitats.— E. Siberia: Dau.; Far East: Ze.-Bu., Uss.; Centr. Asia: Balkh., Dzu.-Tarb., Amu D., Syr D., T. Sh. (submontane part). **Gen. distr.:** Ind.-Him., Dzu.-Kash., Mong., Jap.-Ch. (excluding the central provinces of China). Described from China. Type in Leningrad.

Subgenus 3. **THORA** DC., Prodr. I (1824) 30; Prantl in Engl. Bot. Jahrb. IX (1888) 267; Engl. u. Prantl, Pflzfm. III, 2, 65.

Petals (nectaries) yellow; fruitlets rounded-convex, with prominent veins. Herbaceous perennials with thickened fleshy roots.

55. **R. helenae** Alb. in Tr. Obshch. Sadov. v Odesse (1891); Bull. Herb. Boiss. I, (1893), 253; N. Busch in Fl. cauc. crit. III, 3, 133; Grossg., Fl. Kavk. II, 109.

Perennial, small, to 10 cm high, quite glabrous; rootstock oblique, short, distally covered with grayish brown remnants of old sheaths; stems 1-2, ascending, slender, 1- or 2-flowered; radical leaves long-petioled, broad-ovate or suborbicular, with 3 to many large obtuse teeth above; cauline leaves oblong-ovate or lance-linear; sepals spreading, submembranous, yellowish; petals narrowly obovate, narrowed proximally, longer than sepals; fruitlets 5 or 6, irregularly ovate, inflated, glabrous or remotely and minutely glandular with prominent branching veins, beak terminal, short, slender slightly curved or almost straight. June-July.

Alpine meadows and pebbles near patches of snow, at 1,800-2,500 m. — Caucasus: Cisc., W. Transc. Endemic. Described from Abkhazia. Type in Tbilisi (?).

Subgenus 4. **CHRYSANTHE** Spach, Hist. Veg. VII (1839) 212. — Sect. *Ranunculus* VI, DC., Syst. Veg. I, (1818), 237, 266 ex pte. — Sect. *Hecatomia* DC., Prodr. I, (1824), 30, ex pte. — Sect. *Butyanthus* c. *eubutyranthus* Prantl in Engl. Bot. Jahrb. IX, (1888), 267 and 268 ex pte; in Engl. u. Prantl, Pflzfm. III, 2, 65. — Characters in the key.

1. Leaves 3-5-partite to base with petiolate segments (at least the middle segment petiolate) or pinnatipartite 2.
- + Leaves deeply parted, but not to base, into 3 or more segments . . . 20.
2. Stem ascending or the lower part prostrate. Plants with creeping rooting shoots above ground 61. **R. repens** L.
- + Stems erect, rarely ascending, never prostrate. Plants not producing shoots 3.
3. Stems tuberously thickened proximally; sepals declinate
- 85. **R. bulbosus** L.

* [Bottomland complex of river valleys with woods, bushes, and meadows.]

- 411 + Stems never forming proximal tuberous thickenings 4.
4. Leaves tripartite, with broad-rhombic, more or less ovate, or elliptic segments or else more or less pinnately tripartite 5.
- + Leaves deeply 3-5-partite, with narrowly dissected narrow lanceolate or ovate-lanceolate segments 18.
5. Leaves mostly long-petioled, tripartite, with entire 2-3-fid or 2-3-partite segments, or else - owing to deep dissection of segments into distant, laterally deeply cleft lobes - leaves pinnately ternate or 2-4-ternate 6.
- + Leaves short-petioled, distinctly pinnatipartite, with 3-4 pairs of segments divided into lanceolate or linear lobes. Low-growing plants, 7-16 cm high 17.
6. Middle segment with a very short broadened petiole; lateral segments sessile 7.
- + Middle segment usually long-petioled; lateral segments short-petioled or sessile 8.
7. Plants 20-40 cm high, with appressed or semiappressed setose hairs; leaves rather coarse, somewhat coriaceous; fruitlets to 4-4.5 cm long 63. *R. buhsei* Boiss.
- + Low-growing plants, usually 4-15 cm high, with appressed sericeous hairs, with thin ternately parted leaves; fruitlets to 2.5-3 mm long 64. *R. trisectilis* Ovcz.
8. Fruitlets and pistil hairy or setose 9.
- + Fruitlets glabrous 10.
9. Lateral segments [of leaves] short-petioled; fruitlets in a loose head, large, few, hispid, to 5-6 mm long. . . 59. *R. kopetdaghensis* Litw.
- + Lateral segments sessile or subsessile or else the leaves pinnately ternate; fruitlets smaller, 4-5 mm long, hairy or remotely ciliate 58. *R. raddeanus* Rgl.
10. Leaves large, much broader than long, divided into broadly elliptic or rhombic segments; fruitlets large, 6-8 mm long, the beak to 3-4 mm long, straight, with a broadly involute tip 56. *R. brutius* Ten.
- + Leaves smaller, longer than wide; beak of fruitlets much shorter. 11.
11. Sepals declinate; fruitlets strongly compressed, with a bisulcate border 12.
- + Sepals divergent-spreading but not recurved; fruitlets laterally compressed, with a simple border 13.
12. Annuals or biennials; fruitlets with a row of punctate tubercles extending all along the margin 87. *R. sardous* Crantz.
- 412 + Perennials or biennials (?); fruitlets smooth 86. *R. pseudobulbosus* Schur.
13. Leaves pinnately ternate or pinnatipartite; petioles and stems more or less profusely covered with long drooping or prostrate hairs . . . 14.
- + Leaves tripartite; petioles and stems covered with ciliate more or less distant or semiappressed hairs, rarely glabrous 15.
14. Entire plant profusely covered with long soft drooping or semi-appressed hairs; flowers large, to 2.8-3.6 cm in diameter; fruitlets to 4-6 cm long, the beak elongated, to 2 mm long 57. *R. sommieri* Alb.

- + Stems and petioles covered with shorter spreading or semiappressed hairs; flowers to 1.8–2.4 cm in diameter; fruitlets 3–3.5 mm long, with short beak, to 1 mm long 66. *R. merovensis* Grossh.
15. Leaf segments tripartite, with ovate-oblong incised-dentate lobes; rootstock almost undeveloped; beak of fruitlets 1–1.3 mm long 62. *R. caucasicus* M. B.
- + Leaf segments 3–4 times tripartite with lanceolate dentate lobes, or else the segments oblong-obcuneate, deeply trifid; rootstock more developed, oblique or horizontal 16.
16. Leaves 3–4 times tripartite, with acutely dentate lobes; beak of fruitlets 1–1.3 mm long. Plants 10–20 cm high, sericeous-hairy, with large flowers 2.5–3.5 cm in diameter, rarely glabrous with small flowers 65. *R. napellifolius* DC.
- + Leaves tripartite, with oblong-cuneate deeply and acutely trifid lobes; beak of fruitlets to 0.6 mm long 67. *R. osseticus* Ovcz.
17. Stems ascending, hairy-tomentose; segments of pinnatipartite leaves deeply 2–3-partite, with long linear oblong lobes, with divergent apical teeth; roots cordlike-cylindric, elongated 97. *R. huetii* Boiss.
- + Stems erect or ascending, with distant or semiappressed hairs; segments of pinnatipartite leaves deeply 2–3-partite, with entire or dentate narrow oblong lobes; roots slender, in a dense bundle 96. *R. dissectus* M. B.
18. Receptacle glabrous; leaves deeply 5-palmatipartite, with lanceolate incised dentate lobes; stems appressed-hairy 98. *R. acer* L.
- + Receptacle hairy; stems with spreading hairs 19.
19. Stems densely covered with long setose retrorse often somewhat rufous hairs; middle segment of leaves sessile or short-petioled; beak of fruitlets very short, almost straight, more or less broadly triangular 83. *R. meyerianus* Rupr.
- 413 + Stems with scattered spreading white slender hairs or glabrate; leaves deeply 3–5-partite, with elongate lanceolate incised-partite, dentate segments; beak of fruitlets straight, slender, short, with bent tip 82. *R. polyanthemus* L.
20. Fruitlets orbicular, thin, laterally compressed, winged; beak very short, curved 0.1–0.3 mm long. A glabrous plant with ternate somewhat fleshy leaves and slender, more or less long creeping rootstock— perianth segments often persist in fruit 112. *R. shaftoanus* Boiss.
- + Fruitlets, though laterally compressed, neither flat nor winged; beak longer. All plants hairy, though sometimes only partially so 21.
21. Receptacle hairy 22.
- + Receptacle glabrous 41.
22. Stems undeveloped or short, almost always shorter than the elongated peduncles; stems and leaves glabrous or glabrate; rootstock horizontal, creeping, profusely covered with hairs and remnants of dead leaves 81. *R. lojkae* Somm. et Lev.
- + Stems always well developed, longer than the peduncles 23.
23. Radical leaves 5–6-partite almost to base, with narrow lanceolate lobes resulting from the deep dissection of the lateral segments of the

- ternate blade. Plants 12–20 cm high, with a slender elongated rootstock, glabrate; sepals glabrous 80. *R. abchasicus* Freyn.
- + Leaves shallowly or deeply tripartite; segments broader 24.
24. Stems always hairy 25.
- + Stems glabrous or glabrate, usually slender, weak or ascending . . . 39.
25. Stems covered with appressed, mostly setose hairs 26.
- + Stems covered with spreading, mostly soft hairs 27.
26. Segments of radical leaves very distant, the lateral segments almost right-angled, cauline leaves almost undeveloped, divided to base into narrow-linear lobes 73. *R. sartorianus* Boiss. et Heldr.
- + Leaf segments approached or overlapping; lobes of cauline leaves broader, oblong or lance-linear 31.
- 414 27. Small plants, to 5–17 cm high, mostly 1-flowered, with abbreviated rootstock and solitary stems with appressed setose hairs; leaves thickish; cauline leaves single, small, sessile, deeply divided into lanceolate entire lobes 72. *R. crassifolius* (Rupr.) Grossh.
- + Tall plants, 20–60 cm high, with large 4–17 cm wide, petioled leaves, often with [well] developed creeping rootstock 28.
28. Leaves scarcely notched basally or notched slightly and broadly, reniform-rounded in outline; lobes of cauline leaves oblong-obcuneate, coarsely dentate 71. *R. baidarae* Rupr.
- + Leaves sericeous-whitish especially beneath, more or less rounded-ovate-cordate with a deeply notched, often overlapping base 29.
29. Fruitlets very numerous, small, to 1.5 mm long; with a very short beak, in a compact globose head; leaves large, 10–17 cm broad; rootstock elongated 68. *R. ampelophyllus* Somm. et Lev.
- + Fruitlets 2–3.5 mm long, with a very long beak; leaves smaller . . . 30.
30. Rootstock abbreviated, stout or almost obsolete; cauline leaves sessile, deeply divided into elongate acuminate linear lobes 69. *R. acutilobus* Ldb.
- + Rootstock developed, irregularly tuberculate, with thick lateral excrescences covered by setose hairs; cauline leaves similar to the radical, petiolate 109. *R. baldshuanicus* Rgl.
31. Sepals recurved, with long mostly rigid hairs; stems spreading-hairy, occasionally with semiappressed golden setose hairs 32.
- + Sepals spreading or divergent. Plants mostly covered with soft hairs or with sparse hairs, glabrate 33.
32. Rootstock short, with slender roots; stems covered with more or less spreading golden yellow hairs 89. *R. balkharicus* N. Busch.
- + Rootstock obsolete; roots fascicular, cordlike, somewhat fleshy-thickened; stems with spreading white setaceous hairs 88. *R. neapolitanus* Ten.
33. Leaves suborbicular, base of blade overlapping or contiguous . . . 34.
- + Leaves rounded-cordate or reniform-ovate [in outline], with a broad slightly notched or open cordate base 35.
- 415 34. Leaves glabrous above, hairy beneath, parted to half or more than half their length into broadly obcuneate segments and transversely elliptic lateral, approximate or overlapping segments, apically lobate-cleft and almost bicrenate-dentate 75. *R. dzhavakheticus* Ovcz.

- + Leaves ciliate-hairy on both surfaces, rather thick, tripartite to more than half their length, with approached broad-obovate deeply incised-dentate segments; lower cauline leaves similar to the radical 70. *R. acutidentatus* Rupr.
35. Stems profusely covered with spreading hairs 36.
- + Stems more or less glabrous or with scattered hairs 38.
36. Leaves more or less deeply and narrowly cordate; fruitlets with a very short hamate-tipped beak 74. *R. oreophilus* M. B.
- + Leaves with a broad slightly cordate or scarcely notched base; fruitlets with an elongated broadly involute beak 37.
37. Fruitlets with marginal border along the entire length; beak broadly involute, to 1–1.4 mm long; leaves silky-hairy, cordate-rounded [in outline], tripartite, with obovate or rhombic often approached segments 84. *R. nemorosus* DC.
- + Fruitlets with a very narrow greenish border on upper side only, the beak very short, to 0.7–1.0 mm; leaves tripartite, with cuneate-rhombic nonoverlapping segments 76. *R. submarginatus* Ovcz.
38. Stems erect, solitary; flowers 3–3.5 cm in diameter; petals crenate or emarginate; leaves parted almost to base 78. *R. buschii* Ovcz.
- + Stems weak, slender, almost ascending, arising in small groups from a thickened horizontal rootstock; flowers 2–2.5 cm in diameter; petals not incised 79. *R. gymnadenus* Somm. et Lev.
39. Stems ascending, weak, divaricately spreading from base; flowers not more than 2–2.5 cm in diameter 40.
- + Stems erect, with scattered hairs, subsequently glabrous; flowers large, to 3.5 cm in diameter; petals 5 or 6(9) 78. *R. buschii* Ovcz.
40. Leaves with entire or scarcely dentate broad lobes. Entire plant glabrous, somewhat fleshy, often turning black on drying 77. *R. brachylobus* Boiss.
- + Sepals hairy; leaves more deeply divided into incised and dentate lobes. Taller plants, with well developed rootstock; stems usually with distant hairs, occasionally glabrous, with one to several flowers; petals 5–7, crenate or almost notched. 79. *R. gymnadenus* Somm. et Lev.
- 416 41. Sepals retrorse or recurved 42.
- + Sepals spreading or divergent 48.
42. Flowers 8–10 mm in diameter; petals abruptly contracted into a narrow claw, to 1 mm long; fruiting head loose; fruitlets few (9–13), large, 4–4.7 mm 60. *R. recurvatus* Poir.
- + Flowers much larger; petals tapering; fruitlets smaller 43.
43. Fruitlets 1.5–2 mm long, with slender straight hamately reflexed beak 44.
- + Fruitlets with a short beak not more than 0.3–0.6 mm long 46.
44. Stems glabrous, with scattered appressed hairs confined to the tip; radical leaves with very long petioles, broadly rounded at base; flowers large, to 4 cm in diameter, with incised petals 94. *R. obesus* Trautv.
- + Stems and petioles densely covered with spreading hairs; leaf base more or less notched or rounded; flowers 2.5–3 cm in diameter, petals entire 45.

45. An exuberantly developed plant, densely covered with long white lustrous setose spreading hairs; sepals retrorse or divergent; fruitlets orbicular, the slender beak to 2 mm long 91. *R. villosus* DC.
- + Plants densely covered with rigid oblique dull hairs; sepals recurved; fruitlets more or less obovoid, with a somewhat shorter beak 90. *R. constantinopolitanus* Urv.
46. Leaves deeply tripartite, with thrice-dissected incised-dentate broad more or less rhombic segments; stems many-flowered, densely covered with spreading white slender, usually more or less soft hairs 93. *R. elegans* Koch.
- + Stems with scattered semiappressed, rarely spreading setose hairs, or else with thin silky hairs and then the entire plant glabrate, small, not more than 12–20(25) cm high, with one to few flowers 47.
47. Tall plants; leaves long-petioled, cuneate or rounded, deeply tripartite, the oblong-lanceolate segments twice or thrice dissected into lanceolate entire or coarsely dentate lobes; stems and petioles with semiappressed setose hairs; fruitlets large, to 5 mm 95. *R. kotschyi* Boiss.
- + Plants to 15–20 cm high; leaves more or less short-petioled, with rounded or slightly notched base, deeply tripartite, with divergent 3–4-lobate-cleft oblong-rhombic segments. Glabrate plants or covered with scattered thin silky hairs; fruitlets 3.5–3.8 mm 92. *R. anemonifolius* DC.
48. Stems with distant or retrorse rufous hairs 49.
- + Stems glabrous or with short appressed hairs 55.
49. Leaves rounded-reniform, slightly cordate, truncate, straight, or somewhat cuneate 50.
- + Leaves deeply cordate 51.
50. Large plants; rootstock more or less developed, often with elongated shoots; leaves appressed-hairy, rounded-reniform, the base straight, unnotched 108. *R. japonicus* Thunb.
- + Small Arctic plants, 11–18 cm high, with a bundle of slender roots; leaves with distant flexuous slender hairs, somewhat cordate or cuneate, deeply tripartite 102. *R. lanuginosiformis* Selin.
51. Rootstock undeveloped or obliquely truncate, very short, inconspicuous 53.
- + Rootstock developed, elongated, more or less creeping, prostrate. . . 52.
52. Rootstock irregularly tuberculate, with lateral excrescences covered with setose rufous hairs 111. *R. laetus* Wall.
- + Rootstock more slender, without excrescences, uniformly thickened; leaves large, 10–14 cm broad, deeply 3–5-palmatipartite into large approximate segments 105. *R. grandifolius* C. A. M.
53. Leaves more or less rounded-cordate or ovate-cordate, with approximate segments; stems covered with white hairs 54.
- + Leaves broadly rounded-cordate or rounded-reniform, parted almost to base into obovate-rhombic segments; stems rufous-hairy, especially beneath 104. *R. smirnovii* Ovcz.
54. Stems covered with distant or spreading long hairs; leaves ovate-cordate, almost lanate, more densely so beneath, with broad

- overlapping or approximate segments; beak of fruitlets with broadly oblong-involute-tip, to 1.8–2 mm 103. *R. lanuginosus* L.
- + Stems covered with short spreading hairs; leaves somewhat sericeous-hairy or grayish green beneath; beak of fruitlets shorter, short-hamate-tipped, not rounded 101. *R. borealis* Trautv.
55. Leaves and stems glabrous or glabrate, rarely slightly and finely downy 56.
- + Leaves and stems with scattered mostly short setose hairs 58.
- 418 56. Small Arctic plant, 10–25 cm high, with slender 1-flowered glabrous or slightly more or less appressed-hairy stems; leaves small, 1.5–3 cm broad, glabrate; flowers 1.6–1.8 cm in diameter, pale yellow or whitish yellow; fruitlets 2.2–2.5 mm long, with very short beak (to 0.5 mm); sepals slightly hairy . . . 100. *R. glabriusculus* Rupr.
- + A larger plant, with many-flowered or few-flowered glabrous branching stems; fruitlets to 4 mm long; flowers bright yellow; sepals densely hairy 57.
57. Beak of fruitlets to 1 mm long, with short hamate tip. Plant to 40 cm high; stems glabrous or glabrate; flowers more or less numerous; sepals divergent, villous 106. *R. subcorymbosus* Kom.
- + Beak of fruitlets longer, slender, broadly curved-hamate; sepals somewhat spreading 107. *R. jacuticus* Ovcz.
58. Tall plant, to 40–60 cm high, usually with developed slender creeping rootstock; stems entirely covered with rufous setose hairs; leaves large, tripartite, with broad oblong-rhombic segments; flowers of medium size, to 1.7–2 cm in diameter, petals 5 109. *R. steveni* Andrz.
- + Similar to the above, but rootstock always developed, tuberculately thickened, often with a lateral excrescence with scattered short setose brownish hairs; stems with scattered short appressed hairs 110. *R. baldshuanicus* Rgl.
- ++ A mountain plant, to 8–30 cm high, mostly with abbreviated rootstock; leaves with obovate cuneate segments; flowers to 1.8–2.5 cm in diameter; petals 5–7; sepals spreading . . . 99. *R. propinquus* C.A.M.

Cycle 1. *Longirostres* Ovcz. — Glabrate green or whitish-pubescent plants; radical leaves deeply divided into petiolate, rarely sessile segments; fruitlets large, to 7–8 mm long, the beak about half their length or more, annularly curved; receptacle hairy.

Series 1. *Latifolii* Ovcz. — Blade of radical leaves broader than long, to 11–19 cm broad. Slightly hairy plants; fruitlets glabrous; flowers of medium size, 1.8–2.5 cm in diameter.

56. *R. brutius* Ten., Prodr. Fl. Napol. p. LXI ex Ten. in Fl. Napol. I, (1810–1815), 315; Boiss., Fl. Or. I, 45; Busch in Fl. cauc. crit. III, 3, 154. — Ic.: Ten., l. c. (atlas) tab. 50. — Exs.: P. Sintenis, iter Thessalicum, 1896, No. 643; Herbar. edit. J. Dörfler No. 4442. Russian Name: Lyutik Kalabriiskii [Calabrian].

Perennial, 40–70 cm high; rootstock more or less horizontal, elongated or abbreviated, its lower part profusely covered with branching root fibers; stems mostly solitary, tall, with scattered weak hairs, distally branching, 3–10-flowered, with elongated appressed-hairy peduncles; radical leaves with elongated hairy sheaths and long petioles covered with distant hairs, the blade broadly rounded-reniform in outline, large, 5–12 cm long, 11–19 cm broad, tripartite into petiolate segments, the lateral segments bipartite, the middle segment tripartite, the lobes oblong-lanceolate or lanceolate-elliptic, 2–3-incised or with small acute entire teeth; the dark green thin blade covered with scattered slender appressed hairs, especially beneath, mainly along the veins; cauline leaves short-petioled or sessile, similar to the radical leaves, the upper leaves 2–3-partite to base into lanceolate acutely denticulate segments; receptacle short, with an apical tuft of straight ciliate hairs; flowers 1.8–2.5 cm in diameter; petals broad-obovate; sepals divergent, oblong-ovate, hairy; fruitlets large, 6–8 mm long, laterally compressed, glabrous, orbicular or unequally obovate, with prominent longitudinal veins in upper part, the beak 3–4 mm long, straight, short-rounded-tipped, displaced toward the back. June–July.

Broadleaf (maple, beech) and coniferous forests to the subalpine zone, 1,800–1,900 m, inclusive. — Caucasus: W. Transc.; European part: Crim. **Gen. distr.:** Bal.-As. Min. Described from Italy (Calabria). Type in Naples (?).

Note. The Crimean plants are distinguished from the type by the shorter beak of the fruitlets and by the smaller more-incised leaves, and may constitute a distinct race, *R. brutius*. In the Crimea there occurs a series of species [sic!] which I have referred to *R. caucasicus* but which also show affinity to the Crimean *R. brutius*. Specimens from the Kuban River area should apparently also be referred to *R. caucasicus* but may represent hybrid forms transitional between *R. brutius* and *R. caucasicus*.

Series 2. Oblongifolii Ovcz. — Sericeous-hairy plants; leaves longer than broad; fruitlets to 5–6 mm long, with a shorter beak (to 2.2 mm), glabrous or hairy; flowers large, 2.5–3.5 cm in diameter.

57. *R. sommieri* Alb. in Bull. Herb. Boiss. I, (1893), 245. — *R. raddeanus* subsp. *sublejocarpus* Som. et Lev. Enum. (1900) 10; N. Busch in Fl. cauc. crit. III, 3, 160. — *R. raddeanus* subsp. *sommieri* N. Busch in Fl. cauc.-crit. III, 3 (1903), 160.

420 Perennial, 17–50 cm high; rootstock stout, short, more or less horizontal or ascending, bearing numerous fibers of dead leaves, especially in upper part, and with scattered long white appressed hairs, with numerous slender roots; stems erect, solitary, mostly stout, distally branched, with more or less divaricate branches, 2 or 3-flowered, covered with soft long white drooping hairs, these especially dense in lower part, shorter in upper part of stem, occasionally the stems glabrous throughout (f. *glabriusculus* Alb.); radical leaves with scarious-coriaceous glabrous sheaths and with long petioles covered with white distant mostly semiappressed hairs, the leaf blade mostly large, ovate or oblong-ovate in outline,

pinnately ternate, the middle segment with long petioles covered with long hairs, parted to half or beyond half its length into 3 more or less obtriangular lobes, these divided or dissected into incised-dentate lobules, the lateral segments sessile or subsessile, tripartite, the oblong-cuneate apically broadened lobes dissected into oblong acutely 2-3-dentate lobules, the leaf blade mostly glabrous above, with scattered long hairs beneath; lower cauline leaves sessile or petiolate, similar to the radical leaves but with narrower lobes, the upper leaves biternately dissected into linear lobes; peduncles finely sulcate (conspicuously so in fruit); flowers large, 2.8-3.6 cm in diameter; sepals hairy, distant, sometimes curved after flowering; receptacle with upright ciliate hairs at the apex; fruitlets glabrous, with an almost carinate acuminate dorsal border, with 3 marginal veins very conspicuous in upper part below the beak, 4-6 mm long; beak broadly involute, elongated, to 2 mm long, hamate-tipped. July-August.

Damp subalpine meadows and riverbanks to 2,000-2,500 m. - Caucasus: Cisc., W. Transc. Endemic. Described from the Caucasus. Type in Geneva.

58. *R. raddeanus* Rgl., Ind. Sem. Hort. Petrop., (1865), 39; Boiss., Fl. Or. suppl., 11; N. Busch in Fl. cauc.-crit. III, 3, 159. - *R. caucasicus* Rupr., (non M. B.), Fl. Cauc. I, (1869), 25, ex pte.

421 Perennial, 20-30(45) cm high; rootstock thickened, strong, with a bundle of root fibers and scattered rigid hairs, profusely covered with a thin fibers of dead petioles; stems solitary, with 2 to few flowers, slightly branching distally with more or less appressed branches, rarely simple, 1-flowered, with scattered spreading-drooping long hairs, densely hairy proximally; radical leaves ovate or ovate-rhombic in outline, long-petioled, pinnately ternate, the lower lateral segments sessile or subsessile, distant, tripartite, with incised-dentate lobes; there is a long petiole with tangled hairs between the lower and the upper pair of segments (or - if the latter absent - between this and the upper segment); all segments deeply 3-5-partite, with linear-oblong or oblong cuneate incised-dentate lobes; lower leaves petiolate, similar to the radical; all blades covered with more or less appressed long white sericeous hairs, especially beneath; upper leaves sessile, ternately divided into linear entire or acutely cleft lobes; peduncles appressed-hairy, smooth; flowers 2-3.5 cm in diameter, with 5 or 6 broad-ovate petals; sepals broad-ovate, subobtusate, greenish yellow, spreading or somewhat recurved; receptacle covered with short sericeous hairs; fruitlets laterally compressed, 4-5 mm long, rounded-obovate, with scattered hairs; beak annularly curved from base, with hamate tip and with 2 prominent marginal veins. July-September.

Subalpine, rarely alpine meadows at 2,500 m. - Caucasus: W. Transc. Endemic. Described from the Caucasus (mountainous Svanetiya). Type in Leningrad.

Note. *E. raddeanus* and *R. sommieri* are very closely related, and are distinguished merely by the fruitlets (hairy in *R. raddeanus*, glabrous in *R. sommieri*), and the more glabrous receptacle of the latter. Dissection of the leaves and general pubescence, as well as their geographical distribution, do not appear to provide reliable distinctions. It may be expedient to follow N. A. Busch (l.c.) in uniting them, but, due to

the insufficiency of available information, this is not yet possible; and further field studies are required.

59. *R. kopetdaghensis* Litw. in Trav. Mus. Bot. Ac. Sc. I, (1902), 26. — Exs.: H. F. A. M. No. 141.

Perennial, 20–40 cm high, 1–3-stemmed, with stout well developed horizontal or ascending rootstock distally covered with fibers of dead petioles; leaves with appressed silky hairs, the petioles of the radical leaves densely covered with spreading hairs, especially proximally, their blades broad-ovate in outline, tripartite; the segments cuneate, the lateral short-petioled, deeply 2–3-partite, the middle one long-petioled, tripartite, with 2–3-incised and acutely dentate lobes; cauline leaves sessile, with amplexicaul hairy-margined sheaths, tripartite, with oblong-lanceolate, entire or cleft segments; stems ascending-strict, striate, with dense or scattered drooping hairs, distally 2–5-branched, 6-flowered; peduncles obscurely sulcate; sepals more or less divergent, hairy, 7–8 mm broad, ovate-elliptic; flowers 2–3 cm in diameter; petals 5(8), 12–14 mm long, broad-obovate, narrowing toward base; fruitlets large, 5–6 mm long, with rigid hairs, almost obovoid, more or less compressed laterally, with a vein adjacent to the narrowly winged border, the slender beak ascending from base, shortly and strongly rounded, to 1.6–2.2 mm long; fruiting head more or less globose, loose, with few, not fewer than 10–12 fruitlets. June–July.

Damp subalpine meadows. — Centr. Asia: Mtn. Turkm. Endemic. Described from the Kopet Dagh Mountains. Type in Leningrad.

Note. This species is very closely related to *R. trichocarpus* Boiss. from Iran.

Cycle 2. *Recurvati* Ovcz. — Flowers small, to 10 mm in diameter, with petals narrowing into a conspicuous claw; sepals recurved; receptacle glabrous; fruitlets to 4.5 mm in diameter, crowded in a loose head, with a long involute beak.

60. *R. recurvatus* Poir. in Lam. et Poir. — Encycl. VI (1804), 125; Ldb., Fl. Ross. I, 44; B. Fedtsch., Iles Command. 35, No. 10; Kom., Fl. Kamch. II, 148.

Perennial, tall, to 30 cm high, with a short rather stout more or less vertical rootstock bearing profuse slender fibers and erect tall hollow many-flowered stems, the entire plant covered with setose somewhat rufous distant hairs; radical leaves long-petioled, rounded-reniform, 5–8 cm broad, 4–6 cm long, tripartite for more than half their length, with broad obovate or obovate-rhombic cuneate acutely incised-dentate segments, the blade covered with appressed and the petioles with distant setose hairs; cauline leaves short-petioled, similar to the radical leaves, but with narrower, more acutely and deeply cleft segments; bracts sessile, 2–3-partite, with acutely lanceolate or linear-lanceolate lobes; peduncles finely sulcate, finely appressed-hairy, short, in groups of 2–4; flowers small, 8–10 mm in diameter, often crowded; sepals short, recurved; petals narrowly spatulate-elliptic or lanceolate, 4–5 mm long, passing abruptly into a 1 mm-long claw, 3-veined; fruiting head ovoid, loose, with 9–13 fruitlets; fruitlets 4–4.7 mm long, suborbicular, laterally compressed, slightly and more or less subacutely bordered, smooth, glabrous,

produced into a 1.6–2 mm long straight tapering beak with an acute involute tip; receptacle glabrous. July–August.

Damp localities. — Far East: Komandorskie Islands. **Gen. distr.:** N. Am. Described from the vicinity of New York. Type in Paris.

Cycle 3. *Repentes* Ovcz. — Plants with creeping shoots; leaves 1–2-ternately dissected, the segments, at least the middle segment, mostly petiolate.

- 423 61. *R. repens* L., Sp. pl., (1753), 554; Ldb., Fl. Ross. I, 44; Shmal'g., Fl. I, 21; Busch in Fl. cauc. crit. III, 3, 152; Kom., Fl. Kamch. II, 42; Kryl., Fl. Zap. Sib. V, 1208. — Ic.: Rchb., Ic. Fl. Germ. f. 4610.

Perennial; rootstock abbreviated, with cordlike fibers; usually entire plant glabrous, sometimes hairy; stems 15–70 cm long, prostrate or ascending, weak, with long, terrestrial creeping sometimes rooting shoots; all except uppermost leaves with glabrous or hairy petioles, 3–15 cm long, the blade 3–7 cm long, 4–11 cm broad, compound, 1–2-ternately dissected, petiolules of segments to 1–3 cm long, rarely shorter, longer in middle segment, all segments more or less deeply trisected into incised or incised-dentate lobes; flowers with sulcate pedicels, 15–23 (30) mm in diameter, golden yellow, lustrous, with glabrous divergent sepals; petals 5, twice as long as sepals; fruiting head globose; receptacle somewhat hairy; fruitlets rounded-ovate, compressed, bordered, densely covered with punctate pits, the beak almost straight, rather long. May–August.

Damp soil and meadows, sometimes solonchic herbaceous bogs, banks of rivers and lakes, ditches and rivulets, forest clearings, etc., mainly in mountain plains not reaching the timberline and becoming sparser in the north. — European part: all regions except the far north, from Kar.-Lap. and Dv.-Pech. to Bess., L. V., Crim. in the south; Caucasus: all regions; W. Siberia: E. Siberia: Far East: Kamch. **Gen. distr.:** Scand., Centr. and Atl. Eur., Med., Bal.-As. Min., Arm.-Kurd., Iran (N.). Introduced in America. Described from Europe. Type in London.

Note. Size, length, breadth, and dissection of leaves, etc. highly variable.

Cycle 4. *Trisecti* Ovcz. — Leaves deeply twice trisected or tripartite with petiolate segments or tripartite with a short-petioled middle segment; all segments more or less ovate or elliptic; beak of fruitlets to 1–1.5 mm long.

Series 1. *Latilobi* Ovcz. — Leaves tripartite, their ovate or more or less elliptic segments incised-dentate or divided into broad lobes.

62. *R. caucasicus* M. B., Fl. taur.-cauc. II, (1808), 27; III, (1819), 384; Ldb., Fl. Ross. I, 41 et 732; N. Busch in Fl. cauc. crit. III, 3, 154. — Exs.: Fl. cauc. exs. No. 231.

Perennial, large, 20–100 cm high; rootstock almost undeveloped, stout, like lower part of stem covered with fibers of dead leaves; stems

mostly solitary, somewhat branched, with scattered semiappressed or obliquely spreading ciliate hairs, few-flowered; radical leaves with long sulcate petioles covered with semiappressed and spreading hairs, with a strong elongated broad sheath, the blade broad-ovate or broadly ovate-rhombic in outline, twice tripartite, the lateral segments petiolate or subsessile, the middle segment more or less long-petioled, all segments deeply tripartite, with ovate-oblong incised-dentate lobes; the lower cauline leaves similar to the radical, the upper sessile, all cauline leaves tripartite almost to base, with 2-3-incised and dentate, ovate-lanceolate segments, the latter rarely entire, narrower; peduncles appressed-hairy, not sulcate; flowers 1.8-2.8 cm in diameter; sepals oblong-elliptic, divergent, hairy; receptacle apically short-setose; fruitlets glabrous, laterally compressed, 3.5-4(5) mm long, unequally obovoid, with veins along margins and short, 1-1.3 mm long, hamately involute beak. June-July. (Plate XXVI, Figure 1).

Broadleaf, rarely coniferous forests and subalpine meadows, occasionally penetrating the alpine zone. — European part: Crim.; Caucasus: all regions. **Gen. distr.:** Arm.-Kurd. Described from the Caucasus (vicinity of Pyatigorsk). Type in Leningrad.

Note. A very variable species. There are records of an alpine form (f. *alpicola* Trautv.) to 4-10 cm high, with single, often larger, flowers and abbreviated petioles of the middle segment of radical leaves and of a densely hairy form (var. *lanuginosus* Rupr.) where the stems bear spreading hairs throughout and the leaves are sericeous-hairy.

R. modestus Ovcz. sp. nova is intermediate to *R. buhsei* and possibly of hybrid origin. It is distinguished by its almost ternate leaves and soft pubescence and occurs in eastern Transcaucasia, Dagestan, and Talysh.

63. *R. buhsei* Boiss., Fl. Or. I, (1867) 45. — *R. astrantiaefolius* Bal. exs. 1866; Boiss., Fl. Or., suppl., (1888), II, 11 (ex pte). — *R. boissieri* Simonk. in Termesztetrajze Fuz. XI (1887-8) 212. — *R. caucasicus* var. *buhsei* Busch in Fl. cauc. crit. III, 3 (1903) 158.

Perennial, 15-40 cm high; rootstock short, stout, with a bundle of long branched root fibers, profusely covered with fibers of dead leaves; stems solitary, covered with appressed or semiappressed rigid short hairs, especially densely so proximally, furcately branching distally or simple, few-flowered; radical leaves with long petioles, covered with scattered appressed setose hairs, the blade somewhat coriaceous, rounded-triangular or orbicular [in outline], tripartite almost to base, with ovate or obovate segments tapering to base, entire or somewhat incised and denticulate, sessile, with prominent veins beneath; all leaves covered on both sides with appressed almost setose hairs; all cauline leaves tripartite, with oblong-cuneate or lanceolate incised-dentate or subentire lobes, the lowermost petiolate or sessile, similar to the radical but less deeply divided, the upper sessile; peduncles long, slender, often curved; flowers 2-2.8 cm in diameter; sepals distant or even somewhat declinate; petals obovate, cuneate; apex of receptacle with short hairs; fruitlets obovoid, to 4.5 mm long, compressed laterally, bordered by a thin vein, glabrous, with a straight hamate-tipped beak to 1 mm long. June-August. (Plate XXVI, Figure 2).



PLATE XXVI. 1 — *Ranunculus caucasicus* M.B., base of plant and lower radical leaf, upper part of plant with flower, fruitlet; 2 — *R. buhsei* Boiss.; 3 — *R. trisectilis* Ovcz.

Herbaceous slopes and subalpine meadows, in the forest zone, at 1,800–2,200 m. — Caucasus: Cisc., W. Transc. **Gen. distr.:** As. Min. (Lazistan), Iran. Described from Asia Minor. Type in Geneva; cotype in Leningrad.

Note. We follow the description as the type specimen cited by Boissier does not fit it. As type we have chosen specimens of Shovits (exs. No. 182) from northern Iran, cited by Boissier, and represented by two leaves in the Botanical Institute of the Academy of Sciences.

64. *R. trisectilis* Ovcz., sp. nova in Addenda VI, p. 743. — *R. astranti-aefolius* var. *alpinus* Freyn in Somm. et Lev., Enum. pl. cauc., (1900), 7. — *R. caucasicus* var. *alpina* N. Busch in Fl. cauc. crit. III, 3, (1903), 159.

428 Perennial, 4–10 (18–25) cm high; rootstock abbreviated, with a bundle of cordlike slender fibers; stems 1–3, slender, erect or somewhat ascending from base, covered with scattered thin sericeous appressed or semi-appressed, rarely spreading hairs, simple, 1-flowered, rarely with 1 slender elongated lateral branch and then 2-flowered; radical leaves small, the petioles more or less short, with appressed ciliate hairs, the blades orbicular or rounded-ovate in outline, glabrous above, glabrous or with appressed sericeous hairs beneath, tripartite to base, the sessile segments (the middle segment occasionally subsessile) often contiguous marginally, orbicular or obovate-rounded, apically acutely incised-dentate, with triangular or serrate teeth; cauline leaves sessile, the lower deeply 3–4-partite with lanceolate lobes, the upper 2–3-partite: peduncles finely sulcate, with appressed short hairs; flowers small; petals 5, obovate, cuneate, with slightly crenulate apex; sepals oblong-elliptic, obtuse, with scattered ciliate hairs; receptacle hairy, linear; fruitlets small, 2.5–3 mm long, flat, rounded-ovoid, the border somewhat digressing from the margin, dorsally acutely carinate, the short, to 1 mm long beak straight from base then hamate. July–August. (Plate XXVI, Figure 3).

Meadows in the alpine zone. — Caucasus: W. and E. Transc., Dag. Endemic for the Main Caucasus Range. Described from Svanetiya (Mt. Tetenar). Type in Leningrad.

Series 2. *Angustilobi* Ovcz. — Leaves 2–4-ternately divided or pinnately ternate, with narrowly divided segments.

65. *R. napellifolius* DC., Syst. I, (1818), 282; Prodr. I, 37; Boiss., Fl. Or. I, 44; Koch in Linnaea XV, 249; Ldb., Fl. Ross. I, 43, 733. — *R. caucasicus* var. *alpicola* Trautv. in A. H. P. II, (1873) 442; Busch in Fl. cauc. crit. III, 3, 157.

Perennial, to (7) 10–25 cm high, sericeous-hairy; rootstock thickened, more or less developed, oblique, with a bundle of more or less slender cylindric root fibers; stems mostly solitary, 1 or 2-flowered, erect, rarely slightly branched distally, densely covered with appressed or semi-appressed upward-pointing hairs; radical leaves mostly long-petioled, the blade covered with scattered hairs, mostly broad-ovate in outline, 3–4 times tripartite, the middle segments petiolate, the lateral sessile or subsessile, all segments, especially the middle ones, deeply tripartite,

those tapering to base ovate-lanceolate, deeply tripartite, their lobes elongate-lanceolate, apically broadened, trisected into entire or dentate lobules; the petioles slightly appressed-hairy, rarely glabrous (f. *glabratus* Ovcz.) or with somewhat spreading hairs proximally, sulcate, the blade glabrous above, with scattered hairs beneath; cauline leaves sessile, tripartite, their lobes lanceolate or linear-lanceolate, entire or incised into linear lobules; flowers large, to 2.4–3.5 cm in diameter; sepals hairy on the outside, obtuse, distant, oblong; receptacle slightly hairy; [immature] fruitlets (mature fruitlets not seen) glabrous, laterally compressed, rounded-ovoid, with prominent veins along margins, the beak more or less developed (to 1–1.3 mm), straight or somewhat curved from base, hamate-tipped, displaced toward the back; nectariferous gland covered by a short (to 0.75 mm) apically rounded, mostly emarginate scale. May–July.

Scrub, aspen woods, and meadows in the subalpine zone at 1,800–3,200 m. – Caucasus: E. and S. Transc. Gen. distr.: Arm.-Kurd., Bal.-As. Min. Described from Cappadocia. Type in Geneva.

429 Note. In alpine meadows near snow patches at 2,800–3,500 m in S. Transc. (Mt. Alagez) there is a separate form referred by E. A. Bush to *R. napellifolius*, Tr. Tiflissk. Bot. Inst. 1934, p. 209) from which it is distinguished by: 1) smaller dimensions; 2) almost obsolete straight rootstock; 3) smaller flowers; 4) usually proximally glabrous stems and petioles; 5) 1–2-ternate leaves with narrow linear-lanceolate lobes and an often sessile middle segment; 6) glabrate receptacle. This plant is clearly distinguished from the type, but there are forms transitional to *R. napellifolius* and possibly also to *R. merovensis*.

66. *R. merovensis* Grossh. in Beih. z. Bot. Zentralbl. XLIV, 2, (1927), 212. Exs.: Pl. Or. exs. No. 263.

Perennial, 14–25(30) cm high, with 1–2 (or several) stems, the rootstock short, thickened, with elongated slender cylindric roots, covered with long white hairs which are sometimes hidden by the more or less compact fibrous jacket of dead leaves; stems 1 or 2, often somewhat curved, sulcate, usually with 1 or 2, rarely 4 flowers, densely covered (especially proximally) with long spreading ciliate hairs, more often with dense short hairs; the hairs subappressed in upper part of stem; radical leaves more or less numerous, their long petioles glabrous or more often with scattered spreading hairs, the leaf blade oblong or narrowly oblong-ovate, pinnately ternate, mostly with 2–3 pairs of sessile or subsessile lateral segments and usually separated by a hairy petiole, more or less ovate or ovate-rhombic in outline, mostly deeply tripartite (but not to base), with short-oblong sub-rhombic trifid lobes, the lobules of the middle lobe more developed and more or less acutely dentate, the others entire or dentiform, the middle segment petiolate, 2–3-ternate, viz. deeply tripartite, with more or less obovate, often cuneate lobes, the lateral lobes trifid or tripartite with dentate lobules, the middle lobe tripartite almost to base with 2–3-incised-dentate, more or less short-oblong lobules; cauline leaves divided to base or almost to base into entire or sparsely dentate linear or lanceolate segments; peduncles slender, sulcate, appressed-hairy; flowers with 5 obovate bright yellow petals, 1.8–2.4 cm in diameter; receptacle apically slightly ciliate-hairy; fruitlets 3–3.5(4) cm long, obovoid or more or less oblong-obovoid, the straight beak 0.6–1 mm long, with tip hamately involute. June–July.

Subalpine, sometimes alpine meadows. — Caucasus: W., E., and S. Transc.
Gen. distr.: Iran. Described from Mt. Meshau-dag near Djam station
in Iran.

430 67. *R. osseticus* Ovcz., sp. nova in Addenda VI, p. 572. — *R. caucasicus* et *R. raddeanus* auct. Fl. Cauc. p.p.

Perennial, 23–55 cm high, mostly 1- or 2-stemmed; rootstock thickened, oblique or subhorizontal, with numerous branching root fibers; stems tall, mostly long-branched distally, covered throughout with short ciliate semiappressed or slightly spreading hairs, rarely glabrate (f. *glabratus* Ovcz.), few-flowered; radical leaves long-petioled, the petiole passing into a long broadened light brown sheath with scattered appressed or semiappressed short-ciliate hairs, the leaf blade large, to 3.5–7 cm long, to 4–9.5 cm broad, broad-ovate or ovate-rounded, tripartite, the petiole middle segment and the sessile lateral segments — especially the middle ones — tripartite deeply or almost to base, the lobes oblong-obcuneate, rarely obovate-cuneate, tripartite almost to middle, the lobules elongate, more or less acuminate, incised-dentate or incised-serrate, the blade mostly with scattered hairs, especially along the veins beneath; lower cauline leaves usually undeveloped, and if developed then more or less petiolate, similar to the radical leaves, the upper cauline leaves sessile, 3–5-partite to base, with elongate linear lobes; peduncles covered with appressed, more or less spreading short hairs; receptacle with few short hairs at the apex; flowers orange-yellow or dark yellow, often in a semisetiform inflorescence; petals 5, rarely more, to 2.7–3.4 cm in diameter, obovate; immature fruitlets 3.5–3.8 mm long, more or less obovoid, laterally compressed, more or less carinate, with 2 more or less prominent curved parallel dorsal veins, with one ventral vein also receding from the margin, on the upper surface with additional conspicuous short longitudinal veins, the short beak to 0.5–0.6 mm long, hamately involute from the middle. June.

Subalpine meadows. — Caucasus: E. Transc. (South Ossetia). Endemic. Described from South Ossetia. Type in Leningrad.

Cycle 5. *Ampelophylli* Ovcz. — Fruitlets numerous, in a compact head, slightly convex, small, to 1.5 mm long, with a very short beak, glabrous; radical leaves broadly cordate-ovate; lobes of cauline leaves broad-lanceolate.

68. *R. ampelophyllus* Som. et Lev. in Nuov. Giorn. Bot. Ital., (1894), 9 et in A. H. P., XVI, (1900), 11; B. Busch in Fl. cauc. crit. III 3 (1903), 174. — *R. macrophyllus* Ldb., Fl. Ross. I, (1842) 42, non Desf. — *R. vitifolius* Boiss. et Bal. in Bal. exsicc. 1866, non Royle; Boiss., Fl. Or. Suppl., (1888), 9. — *R. ledebouri* Lipsky, Fl. Kavk. (1899) 327. — Exs.: Herb. Fl. Cauc. No. 120; Pl. Orient. exs. No. 180.

431 Perennial, 20–60 cm high, rootstock developed, thickened, often elongated and branched, with more or less scattered short setose hairs and long slender roots; stems tall, sulcate, glabrous, with scattered appressed or semiappressed ciliate hairs, branching distally, with several or many flowers; radical leaves long-petioled, the blade 10–17 cm broad, 6–13 cm long, pentagonal-rounded-ovate in outline, trisected almost to the

middle or beyond into broad, often not contiguous, acute segments, the middle segment rhombic, trifid, the lateral segments broader, irregularly ovate-rhombic, usually bifid, all segments acutely incised-dentate, the leaf blade cordate, with the lateral segments occasionally contiguous or overlapping, covered with appressed hairs, especially beneath, where the hairs are yellowish white; lower cauline leaves short-petioled or sessile, similar to the radical, the upper leaves small, 3-5-partite, with lanceolate or broad-lanceolate entire or acutely dentate lobes; fruiting peduncles sulcate; receptacle clavately thickened, hispid; flowers 1.9-3 cm in diameter, with hispid divergent sepals and with 5(-9) obovate petals to 9-15 cm long; fruitlets very numerous, in a globose head, small, ca. 1.5 mm long, ovoid, almost compressed, minutely punctulate when magnified, with sharp edges and a very short almost hamate-tipped beak. June-August. (Plate XXVII, Figure 1, a-c).

Beech, birch, and sometimes coniferous (fir) forests in the forest zone of the Caucasus, to the timberline at 2,000 m. A characteristic plant for W. Transcaucasia, beyond which it is known in the regions under Pontic influence. — Caucasus: Cisc., W. and S. Transc. Gen. distr.: Bal.-As. Min., Arm., -Kurd. Described from the Caucasus. Type in Leningrad.

Cycle 6. *Oreophili* Ovcz. — Radical leaves more or less orbicular or reinform-rounded in outline, deeply tripartite or trifid into broad more or less rhombic segments; receptacle hairy; sepals spreading; fruitlets with or without a narrow border.

69. *S. acutilobus* Ldb., Fl. Ross. I, (1842), 40, non Rupr., Fl. cauc. I, (1869), 22. — *R. villarsii* subsp. *acutilobus* N. Busch in Fl. cauc. crit. III, 3, (1903), 167 ex parte.

432 Perennial, 30-48 cm high; rootstock mostly abbreviated, stout, or almost undeveloped, distally with rigid white hairs, profusely covered with fibers or dead leaves; stems mostly branched from the middle or above, sometimes simple, few-flowered, with scattered appressed short setose hairs, rarely glabrate; radical leaves long-petioled, the petioles covered with more or less appressed setose hairs or glabrate, passing into broadened sheaths, the blade almost rounded-ovate or cordate-ovate in outline, the base deeply and narrowly notched, more or less deeply tripartite, the segments approximate, separated by narrow mostly acute incisions, the middle segment somewhat narrower and longer than the lateral, irregularly broad-rhombic or broad-obovate, acutely doubly incised-dentate, the blade 4-6 cm broad, 3-5.5 cm long, covered on both sides, especially beneath, with scattered appressed short hairs; cauline leaves 1 or 2, sessile, rarely the lowermost short-petioled, 3-5-partite almost to base, with entire or slightly dentate elongate linear-lanceolate acuminate lobes; peduncles appressed-hairy, not sulcate; receptacle ciliate-hairy; flowers 2.1-2.5 cm in diameter; sepals distant, obtuse, with short hairs, half as long as the 5-6(-8) mostly broad-obovate petals; fruitlets 2.2-3(3.2) mm long, rounded-obovoid or obovoid, glabrous, somewhat compressed or when mature with somewhat prominent sides, the carinate mainly dorsal border very prominent below the beak, the beak short (to 0.5-0.7 mm), proximally



PLATE XXVII. 1 — *Ranunculus ampelophyllus* Somm. et Lev., base of plant and radical leaf, 1a) upper part of stem with flower, 1b) fruiting head, 1c) fruitlet; 2 — *R. acutilobus* Ldb., fruitlet; 3 — *R. subcorymbosus* Kom., base of plant, 3a) upper part of plant, 3c) fruitlet, 3d) nectary (petal); 4 — *R. jacuticus* Ovcz., fruitlet.

broadened with hamately involute tip (straight when dried out). July–August. (Plate XXVII, Figure 2).

Alpine and subalpine meadows, rhododendron thickets, sometimes birch forests, mainly at 1,900–2,800 m. — Caucasus: Cisc., W. and E. Transc. Endemic. Described from the Caucasus. Type in Leningrad.

70. *R. acutidentatus* Rupr., Fl. Cauc., (1869), 286. — *R. acutilobus* Rupr., (non Ldb.), Fl. Cauc. I, (1869), 22, ex pte. — *R. villarsii* subsp. *acutilobus* N. Busch in Fl. cauc. crit. III, 3, (1903), 167 ex pte. — Ic.: Rupr., Fl. Cauc. (1869) tab. III.

435 Perennial, 35–40 cm high; stems branched, mostly many-flowered, rather stout, erect, canaliculate, like the petioles entirely covered, with spreading, rarely semiappressed or retrorse ciliate hairs; radical leaves numerous, long-petioled, the blade orbicular or obvate-rounded in outline, parted to beyond the middle into 3 broad-rhombic or broad-obovate mostly contiguous or overlapping segments, the middle segment mostly deeply trifid, the lateral deeply bifid, irregularly acutely dentate, the acuminate teeth with an ovate or oblong-ovate base, the acute narrow basal notch of the blade often covered by lateral segments, appressed-ciliate-hairy on both surfaces, somewhat thickish, lighter green beneath; lowermost cauline leaf petiolate with an amplexicaul ciliate-hairy sheath, similar to the radical leaves but smaller, with more acutely and deeply incised segments; upper cauline leaves tripartite almost to base, with lanceolate or oblong-lanceolate entire or incised-dentate lobes; flowers large, 2.5–2.7 cm in diameter, with broadly obovate-rounded petals and somewhat distant oblong-ovate sepals; sepals obtusely scarious-bordered, with scattered hairs at the middle; receptacle hairy; fruitlets 2.5–2.6 mm long, glabrous, slightly convex, more or less ovoid, somewhat carinate, the beak to 0.5–0.6 mm long, straight from base with a short hamate tip. July–August.

Damp subalpine meadows. — Caucasus: Dag. Endemic. Described from Dagestan (Gunib). Type in Leningrad.

71. *R. baidarae* Rupr., Fl. Cauc., (1869), 22, 286; Grossg., Fl. Kavk. II, 119. — *R. villarsii* subsp. *baidarae* Smirn. in Bull. Soc. Nat. Mosc. I (1887) 946; N. Busch in Fl. cauc. crit. III, 3, 169. — *R. ginkolobus* Somm. et Lev. in A.H.P. XVI (1900) 5. — Ic.: Rupr., l.c., tab. II, fa. a–f.; Somm. et Lev., tab. 1 (sub nom. *R. ginkolobus* Somm. et Lev.).

Perennial, 20–40 cm high; rootstock developed, more or less stout, sometimes long-prostrate; stems often somewhat curved, especially proximally, rather stout, striate, long-branched from the middle or above, few-flowered, with peduncles in groups of 2–3, with scattered inconspicuous short appressed setose hairs or glabrate, with longer and somewhat flexuous hairs proximally; the long petioles of radical leaves with sparse scattered appressed or semiappressed more or less setose hairs, in lower part hairs elongated or glabrous, the radical leaf blade thickish, somewhat coriaceous, rounded-reniform in outline with an open broadly notched or almost straight base, with scattered appressed, more or less short setose hairs or glabrate; with very prominent veins, especially beneath, large, 3.5–5.5 cm long, to 5–8.5 cm broad, tripartite to beyond the middle, with approximate irregularly rhombic or broad-obovate segments, the lateral segments broader,

bipartite-dissected, incised and coarsely obtusely dentate, the middle segment coarsely incised-dentate, the long oblong-rounded sinuses mostly open to the top; lower cauline leaves (sometimes also middle leaves at bifurcations) short-petioled, deeply 3-4-partite, with oblong or oblong-obcuneate apically coarsely incised-dentate lobes; upper cauline leaves
436 sessile, tripartite, their lobes oblong or oblong-lanceolate, broad at the apex, with few large teeth, the uppermost leaves 2-3-partite with linear-lanceolate lobes; peduncles appressed-hairy, not sulcate, rather stout; receptacle densely hispid; flowers (1.7)2-2.8(3) cm in diameter; sepals distant, with more or less long hairs on the outside, two-fifths to one half the length of the obovate or oblong-obovate petals; fruitlets 3-3.4 mm long, somewhat irregularly obovoid, laterally compressed, glabrous, the short beak to 0.7-1 mm long, somewhat curved from base, almost hamately curved at the tip, and (apparently only in mature fruitlets) with an inconspicuous carinate border. July-September.

Subalpine meadows, beside rivulets, small meadows beside springs, at 2,600 m. - Caucasus: Cisc., W. Transc., Dag. Endemic. Described from the Caucasus. Type in Leningrad.

Note. *R. gingkolobus* Somm. et Lev. (A.H.P. vol. XVI, 1900, p. 5. tab. 1) appear to be identical with *R. baidarae* although, according to its description by Sommer and Levier, it is distinguished by glabrous stems, petiolate leaves, and sometimes many-petaled flowers. In any case, it is not identical with *R. crassifolius*, which is never slender and branched and which never has petiolate cauline leaves.

72. *R. crassifolius* (Rupr.) Grossh., Fl. Kavk. II, (1930), 119. - *R. oreophilus* var. *crassifolius* Rupr. et var. *araraticus* Rupr., Fl. Cauc., (1869), 20, 286. - *R. villarsii* subsp. *crassifolius* Smirn. in Bull. Soc. Nat. Mosc. (1887) 945; N. Busch in Fl. cauc. crit. III, 3, 171.

Perennial, 5.5-17(21) cm high; rootstock abbreviated, more or less slender, with a bundle of slender root fibers, covered with remnants of dead leaves; radical leaves petiolate, the petioles with more or less scattered appressed setose short hairs, the blade thickish, cordate-suborbicular, rarely rounded-reniform in outline, with more or less scattered appressed setiform hairs, paler beneath, dissected for half or more than half, rarely less than half, its length into 3 mostly approximate or overlapping obovate-rhombic lobes, the middle lobe narrower than the lateral, all lobes incised-dentate, the teeth either triangular or rounded with an obtusely callous apex; cauline leaves 1 or 2, sessile, deeply 3-5-partite, with linear-lanceolate or lanceolate entire or, in lower leaves, slightly incised-dentate lobes; stems solitary, simple, 1 or 2-flowered, sometimes ascending, rarely with a short lateral branch arising from axil of a tripartite leaf with lanceolate-rhombic dentate lobes; stems covered with appressed short straight setose hairs or entirely glabrous; sepals more or less distant, oblong-elliptic or oblong or oblong-ovate, obtusely rounded distally, with scattered appressed and semiappressed setiform often dull hairs and a yellowish or greenish
437 fimbriate margin; petals 5, obovate or rounded-obovate, cuneate, slightly sinuate or crenate; flowers 3-3.4 cm in diameter; fruitlets more or less ovoid, glabrous, the beak short, rarely curved, with hamately involute tip. July-August. (Plate XXVIII, Figure 3).

Alpine meadows and pastures. — Caucasus: Dag., E. and S. Transc. Endemic. Described from the Caucasus. Type in Leningrad.

73. *R. sartorianus* Boiss. et Heldr., Diagn. ser. 2, I (1854–1856), 8. — *R. villarsii* β *sartorianus* Boiss., Fl. Or. I, (1867), 41; N. Busch in Fl. cauc. crit. III, 3, 167.

Perennial, 15–30 cm high, with elongated branching or simple 1- to few-flowered short-appressed-hairy stems, densely covered proximally with fibers of dead leaves; radical leaves triangular-cordate in outline, with prominent veins beneath, deeply tripartite (but not to base), with remote oblong-elliptic acutely incised-dentate or dentate segments, the lateral segments at a right angle to the leaf axis more or less overlapping; cauline leaves single, sessile, 2–3-partite to base, with linear entire lobes; fruitlets with an elongated straight somewhat hamate-tipped beak. June.

Alpine zone. — Caucasus; W. Transc. (Abkhaz ASSR). Gen. distr.: Bal.-As. Min., Med. Described from Greece. Type in Geneva.

74. *R. oreophilus* M. B., Fl. taur.-cauc. III, (1819), 383; Rupr., Fl. Cauc., 17. — *R. montanus* Ldb., Fl. Ross. I, 39 (non Willd.) quo ad pl. cauc. — *R. villarsii* Ldb., (non DC.), Fl. Ross. I, 39; Shmal'g., Fl. I, 22; N. Busch in Fl. cauc. crit. III, 3 c. 162 (excl. subspecies).

Perennial, 10–30(40) cm high, mostly 1 or 2-stemmed; rootstock almost undeveloped, with a bundle of root fibers; stems simple or slightly branched, erect or somewhat curved, with 1–3- or several flowers, covered like petioles of radical leaves with spreading, sometimes drooping (var. *patulus* Ovcz.) or else appressed hairs (var. *adpressus* Ovcz.); radical leaves long-petioled, the blade to 2–3.5 cm long, to 2.7–4.9 cm broad, tripartite to lower one-fourth or one-fifth or almost to the middle, with approximate segments, the middle segment narrower, obovate, cuneate, trifid and broadly dentate, the lateral segments broad, irregularly obovate, bipartite almost to the middle and subacutely dentate, the leaf blade narrowly notched at base, covered with scattered appressed hairs; cauline leaves small, sessile, deeply 2–3-partite, with elongate linear or linear-oblong usually entire lobes, rarely lobes of lower cauline leaf incised-dentate (f. *incisifolius* Ovcz.); flowers 1.6–2.6 cm in diameter; sepals elliptic spreading, more or less appressed-hairy; petals 5(6), obovate, often
438 somewhat crenate distally; receptacle slender, cylindric, hairy; fruitlets obovoid, 2–2.7(3.3) mm long, smooth, glabrous, laterally compressed, with a slight thin subacute median border, especially along the dorsal edge, somewhat receding, with one longitudinal vein, the beak very short, hamately involute; sometimes the tip dries out and then the beak appears straight. June–July.

Subalpine and alpine meadows, rarely in forests and among stones. — European part: Crim.; Caucasus: all regions. Described from the Crimea. Type in Leningrad.

Note. A very variable species, apparently comprising a series of young, sometimes little differentiated varieties. The following forms may be distinguished: 1) var. *pumilus* N. Busch — a low plant, 3–10 cm high, 1-flowered, with cauline leaves divided to base into linear entire lobes, growing in carpetlike alpine meadows; 2) var. *caespitans* Ovcz. —

many-stemmed, caespitose plants with leaves less dissected into broader acutely dentate segments and with weak, large-flowered stems, covered with distant ciliate, proximally often tuberculate hairs. This form occurs in high-mountain meadows in South Ossetia and Balkariya; 3) var. *dissectus* N. Busch — plants with radical leaves parted almost to base into narrower deeply incised and acutely dentate segments; stems with setose-ciliate spreading, rarely semiappressed, often somewhat rufous hairs; beak of fruitlets often more elongate, slender. It should also be noted that most Caucasian plants have stems with appressed hairs, while spreading softer hairs are characteristic for Crimean plants. There are also forms transitional to *R. acutilobus* Ldb. and *R. gymnadenus* Somm. et Lev. A proper study of this range of forms requires field observations as well as more and better material than has been at our disposal.

75. *R. dzhavakheticus* Ovcz., sp. nova in Addenda VI, p. 573. — *R. oreophilus*, *R. villarsii* et *R. baidarae* auct. et collect. Fl. cauc., expte. — Exs.: Pl. Or. Exs. (1928) No. 334 sub nom.; *R. baidarae* Rupr. —

Perennial, 15–29 cm high; rootstock more or less developed, obliquely ascending, with setose white hairs in upper part and a row of slender cord-like roots, often with fibers of dead leaves above; stems one or several, erect, simple, 1-flowered, or else branching and 2 or 3-flowered, with spreading long soft white hairs, such as usually cover petioles of cauline leaves; radical leaves numerous, their long petioles usually less than half, sometimes almost half the length of the stem, with an elongated broadened light yellowish-brownish sheath, the blade 3.5–4.5 cm broad, 3–4.3 cm long, orbicular, narrowly and deeply cordate, the base usually almost entirely hidden, tripartite to the middle or to somewhat beyond, rarely trisected, the segments broadly obtuse or the lateral segments almost irregularly transverse-elliptic, apically lobate-incised and almost bicrenate or almost bidentate with obtuse teeth, the sinuses almost obliterated by the overlapping segments, or else the segments oblong with a rounded base, more or less slitlike at the very base, the leaf blade somewhat thickish-rigidulous, glabrous above, with more or less appressed long ciliate hairs, rarely glabrous beneath, with numerous very prominent repeatedly branched veins; lower cauline leaves sessile or petiolate, broadly obtriangular or ovate, tripartite to beyond the middle, with 3–5 narrow or broad remotely dentate-incised and lobate-incised lobes, or else the leaves quite undeveloped, upper cauline leaves sessile, divided to base into 2–3 linear lobes or the uppermost leaves linear, entire; flowers 2–3 cm in diameter, bright yellow; petals 5–7, large, broad-obovate, somewhat crenate at the apex, cuneate; sepals 5, divergent or somewhat declinate, with slightly spreading long silky hairs, yellowish-bordered; fruitlets 2.5–3 mm long, obovoid, laterally compressed or very slightly convex, glabrous, with a short (0.5–0.7 mm) straight, distally hamate-curved displaced beak, very narrowly and acutely bordered (the sides punctulate when magnified); receptacle elongated in fruit, with white long hairs. June–July.

Gravelly slopes and alpine meadows at 2,400–2,700 m. — Caucasus: E. Transc. Endemic. Described from Mt. Tskhra-Tshkaro. Type in Leningrad.

76. *R. submarginatus* Ovcz., sp. nova in Addenda VI, p. 574.

440 Perennial, 20–40 cm high, with a short or almost obsolete rootstock; stems mostly solitary, slender, branched, few-flowered, finely sulcate, proximally profusely covered with dark brown fibers of dead leaves, with spreading retrorse whitish or somewhat golden hairs, rarely with appressed hairs and then the stem glabrate from base; radical leaves with long petioles covered with spreading reclinate or appressed hairs, passing into a hairy sheath, becoming glabrous, the blade broadly rounded-cordate or reniform-cordate, tripartite to lower one-fifth or one-seventh, with distant nonoverlapping segments, the middle segment cuneate-rhombic, apically acutely trifid and acutely dentate, the lateral segments deeply bifid, broader, irregularly and broadly rhombic, acutely dentate-incised, the entire blade covered with short appressed hairs on both surfaces, often sericeous-golden beneath; lower cauline leaf mostly petiolate, similar to the radical leaves; upper cauline leaves sessile, often sericeous beneath, tripartite, with lanceolate or linear-lanceolate entire or somewhat incised lobes; peduncles appressed-hairy, finely sulcate; flowers 2–2.5 cm in diameter; petals 5, broad-obovate; sepals half the length of the petals, ovate-elliptic, covered with spreading long hairs; receptacle hairy; fruitlets obovoid, to 3.5–4 mm long, glabrous, laterally compressed, slightly convex, with a very narrow greenish border confined to the very apex, the beak slender, to 0.7–1 mm long, with a cochlear tip. June. (Plate XXIX, Figure 3, a–c).

Mixed and pine-and-larch forests. — W. Siberia: Alt. Endemic. Described from [the former] Biisk District (Chernyi Anui River). Type in Leningrad.

Note. The systematic status of this and other species of the cycle *Oreophili* remains obscure, and it is doubtful whether the following closely related species should be accorded independent status.

77. *R. brachylobus* Boiss. et Hohen. in Kotschy, Pl. pers. bor. 1846; Boiss., Diagn. Ser. 1, VIII, (1849), 6. — *R. villarsii* var. *brachylobus* Boiss., Fl. Or. suppl., (1888), 10. — *R. villarsii* subsp. *brachylobus* N. Busch in Fl. cauc. crit. III, 3, (1903, 10. — *R. svaneticus* Rupr., Fl. Cauc. I (1869), 21. — *R. montanus* var. *glabrata* Trautv. in A. H. P. II (1873) 492; IV, 1, 101. — Ic.: Rupr., Fl. Cauc. I (1869), tab. I, fig. 3 (sub nom *R. svaneticus* Rupr.). —

Perennial, 5–16 cm high; stems solitary, ascending, glabrous, rarely very slightly pubescent, simple or slightly branching, 1-, rarely 2-flowered, rather stout and fleshy; rootstock almost undeveloped, slender, glabrous, with a bundle of root fibers; radical leaves small, with short glabrous petioles, the blade broadly ovate-rounded or suborbicular, trisected to beyond the middle (rarely almost to base) into 3 broad-obovate or (the lateral segments) reniform-ovate broadly rounded lobes, sometimes the middle lobes more or less ovate, the teeth acuminate or else rounded and abruptly acuminate, rarely obtuse, the leaf blade glabrous on both surfaces, 1.4–2 cm long, 1.5–2.5 cm broad; cauline leaves undeveloped or 1 or 2, sessile, with a short semiamplexicaul basal sheath (very rarely a petiolate lower leaflet present), deeply 2–3-partite, with lanceolate or lanceolate entire lobes; peduncles often thickened distally, not sulcate or slightly sulcate, covered with appressed hairs or glabrous; flowers 1.4–2.3 cm in diameter;



PLATE XXVIII. *Ranunculus buschii* Ovcz.; 2 - *R. brachylobus* Boiss.; 3 - *R. crassifolius* (Rupr.) Grossh.

443 sepals glabrous or glabrate, ovate; petals obovate, somewhat sinuate or crenate; fruitlets 2.6–3 mm long, more or less rounded-elliptic, glabrous, compressed, the beak short (0.6–1 mm), erect, tapering to a hamate tip; receptacle somewhat clavately thickened, somewhat ciliate at the apex. July–August. (Plate XXVIII, Figure 2).

Meadows, beside rivulets, and stone fields in the alpine zone; sometimes descending to the subalpine zone, to 2,700–3,200 m. — Caucasus: Main Range, Dag., W. and S. Transc. Gen. distr.: Bal.-As. Min., Iran, Arm.-Kurd. Described from Iran. Type in Geneva.

78. *R. buschii* Ovcz., sp. nova in Addenda VI, p. 573. — *R. brachylobus* auct. ex pte.

Perennial, 20–35 cm high, with 1 or 2 or several stems; rootstock abbreviated, more or less slender, hairy, or almost undeveloped, with a bundle of root fibers; stems erect, smooth, covered from base with scattered spreading ciliolate hairs or glabrous, mostly with several or numerous radical leaves, simple and 1-flowered or with lateral peduncles and 2-flowered; radical leaves long-petioled, the petioles with scattered spreading hairs or glabrous, the blade rounded-ovate, tripartite to base or almost to base, with broadly rhombic-obovate segments, the middle segment trisected and coarsely rounded-dentate-incised, the lateral segments often bipartite to the middle and coarsely dentate-incised, the leaf blade glabrous or glabrate above, the underside with scattered ciliate hairs, especially along the very prominent veins, or glabrous; cauline leaves sessile, tripartite, with entire, rarely incised linear-lanceolate or linear elongate lobes; peduncles elongated, more or less appressed-hairy; receptacle ciliate-hairy, slightly sulcate; flowers large, 3–3.3 cm in diameter; petals 5–6(9), oblong-obovate, cuneate, slightly crenate or slightly sinuate-emarginate; sepals divergent, ovate, with a thin whitish scarious border, appressed-hairy, fruitlets in a compact more or less ovoid head, 2.6–3.2 mm long, obovoid, laterally compressed, glabrous, slightly and finely bordered, the beak to 0.5–0.6 mm long, straight and broad from the base, uniformly curved and narrowing toward apex, with hamately involute tip. July–August. (Plate XXVIII, Figure 1).

Alpine and subalpine meadows at 2,200–3,000 m. — Caucasus: E. and S. Transc. Endemic. Described from Akhalkalak. Type in Leningrad.

79. *R. gymnadenus* Somm. et Lev. in A. H. P. XIII (1894) 181; A. H. P., XVI (1900) 17. — *R. villarsii* subsp. *baidarae* N. Busch. in Fl. cauc. crit. III, 3 (1903) 169 (ex pte.). — Ic.: Somm. et Lev. in A. H. P. XVI (1900) tab. II et III.

444 Perennial, usually 9–20 cm high; rootstock thickened, developed, often branching and bearing several plantlets and thus forming more or less dense mats; stems weak, simple, rarely slightly branching, 1–3-flowered, with long slender dark brown fibers of dead leaves at base, rather stout, glabrous or with spreading slender cilia below, scattered appressed short hairs above; radical leaves with a dark brown sheath and long weak glabrous petioles with spreading ciliate hairs, somewhat sulcate, the leaf blade sub-orbicular or almost rounded-pentagonal, with narrowly notched or broader base covered or not covered by overlapping lateral segments, with scattered

appressed cilia along the veins and at the margin or else glabrous (first young leaflets sometimes pubescent), tripartite to lower fourth or fifth into approximate but noncontiguous segments, the lateral segments broad, dissected, irregularly obovate-obtriangular, the middle segments broadly obovate-obtriangular, all segments coarsely oblong-lobate-dentate and broadly dentate at the apex, with obtuse teeth; cauline leaves mostly 1 or 2, deeply 2-3-partite, the apex of the undivided lanceolate segments slightly dentate or entire; flowers large, to 2.5 cm in diameter; sepals spreading or somewhat distant, remotely hairy to half their length, glabrous-margined; petals 5-7, rounded-obovate, with a somewhat undulate-dentate apex or emarginate, the nectariferous gland free, not covered by a scale; receptacle ciliate; fruitlets obovoid-rounded, very slightly inflated, more or less carinate, the beak short (one-third as long as fruitlet), somewhat curved from base, hamate-curved or almost hamate distally. July-August.

Alpine (and subalpine?) meadow and near patches of thawing snow above 2,500 m. — Caucasus: W. and E. Transc. (South Ossetia), Cisc. (Main Range). Endemic. Described from Svanetiya. Type in Florence.

80. *R. abchasicus* Freyn in Oesterr. Bot. Zeitschr. XLIII (1893) 373; N. Busch in Fl. cauc. crit. III, 3, 173. — Ic.: Somm. et Lev. in A.H.P. XVI (1900) tab. IV.

Perennial, 12-21 cm high; rootstock prostrate, branching, elongated, more or less slender, cylindric, covered with slender fibers of dead leaves; stems solitary, 1-flowered, rarely 2-flowered, simple, glabrous, with scattered weak semiappressed hairs distally, finely canaliculate; radical leaves glabrous, with long somewhat flexuous petioles, the blade orbicular or suborbicular, tripartite almost to base (rarely pentagonal), the segments obcuneate, dissected to the middle or almost to the middle into lanceolate or oblong obtuse lobes, with prominent veins beneath; cauline leaves mostly one, often at base of lateral flower, 2-3-partite almost to base, with entire linear-lanceolate lobes; peduncles covered with semiappressed short hairs; flowers 1.9-2.1 cm in diameter; sepals glabrous, elliptic, rounded, spreading or recurved; receptacle with an apical tuft of hairs; fruitlets glabrous, obovoid, bordered-carinate, the beak long, as long as the fruitlet proper, somewhat curved. July-August.

Rock fissures and slopes with thin sod at 2,700-2,800 m. — Caucasus: W. Transc. and the Main Caucasus Range in Cisc. (Abkhazia and the upper reaches of the Teberda River). Endemic. Described from Abkhazia. Type in Vienna.

81. *R. lojkae* Som. et Lev. in A.H.P. XIII, (1894) 186; Nuov. Giorn. Bot. Ital. (1894) 10; A.H.P. XVI, (1900) 22; N. Busch in Fl. cauc. crit. III, 3 (1903) 175. — Ic.: Som. et Lev. in A.H.P. XVI (1900) tab. V.

Perennial, small, almost acaulous or short-stemmed, 3-6(18) cm high, 1-flowered, the long peduncle ascending from base or from short 1-leaved stem; creeping rootstock more or less thickened, with slender root fibers, distally covered with dead grayish brown sheaths bearing whitish-ciliate hairs; stems abbreviated, covered with spreading slender hairs or glabrate, sulcate, rarely elongated, longer than the peduncles (f. *longicaulis* Ovcz.); radical leaves glabrous, their petioles with a broad cartilaginous sheath, the blade small, pentagonal-rounded in outline, tripartite almost to

base, the middle segment tridentate-lobate, the lateral bifid, all segments deeply and obtusely incised-dentate; cauline leaves 1 or 2, almost undeveloped, the lower leaf short-petioled, similar to the radical leaves, with an amplexicaul sheath; sepals recurved, with scattered long hairs; petals 5-6, golden yellow, broadly sinuate or bilobate; receptacle hairy; fruitlets 2.5-3.5 mm long, obovoid, glabrous, carinate, more or less compressed laterally, the beak short, straight, to 0.6-0.8 mm long, with hamate curved tip. July-August.

Stone fields in the alpine zone of the central part of the Main Caucasus Range at 2,600-3,200 m. — Caucasus: W. and E. Transc. Endemic. Described from the Mamison Pass. Type in Florence.

Cycle 7. *Polyanthemi* Ovcz. — Sepals spreading; receptacle hairy; fruitlets bordered, with a short straight or curved broad beak; leaves mostly deeply divided into narrow linear or lanceolate lobes, these often subsessile, rarely broad, little incised. Densely hairy or glabrate plants.

- 446 82. *R. polyanthemus* L., Sp. pl., (1753), 554; Ldb., Fl. Ross., I, 41; Shmal'g., Fl. I, 21; Kryl., Fl. Zap. Sib. V, 1207. — Ic.: Shmal'g. in Tr. SPb. obshch. estestv. V (1874) tab. 2, f. 13, 14, 18, 21 et tab. 4, f. 23; Rchb., Ic. Fl. Germ. IV, tab. 18.

Perennial, tall, 30-80 cm high; rootstock abbreviated, almost obsolete with a bundle of profuse slender cordlike fibers; stems erect, branched, many-flowered, sulcate, covered to almost half their length with white, rarely somewhat rufous spreading, partly slightly upward-pointing hairs, rarely the entire plant glabrate (var. *glaber* Wim. et Grab.); radical leaves long-petioled, with elongated broad hairy sheaths, the petioles with spreading hairs, the blade rounded-cordate, 3-5-partite to base or almost to base, with deeply and variously dissected segments, their lobes elongate, linear-lanceolate or oblong-lanceolate, often somewhat broadened apically and 2-3, sometimes more, times unequally incised-dentate, often with elongated sideways-pointing teeth (in fact, the leaf blade tripartite, but due to the lateral segments being divided almost to base, it may be said to be quinquepartite; the middle segment usually basally narrowed or petiolate) or else the lobes deeply divided into linear lobules; lower cauline leaves sessile, rarely petiolate, similar to the radical leaves, i. e., 3-5-partite deeply or almost to base with narrower long deeply incised and dentate segments; upper cauline leaves deeply 2-4-partite, with elongate linear-lanceolate entire or somewhat dentate lobes; all leaf blades covered with appressed more or less long hairs on both surfaces, paler green beneath; peduncles sulcate, appressed-hairy; flowers to 2-3 cm in diameter; sepals ovate, obtuse, bordered, covered with long spreading hairs; petals 5(6-7), rarely more (var. *polypetalus* Ovcz.), broad-obovate, large, sometimes somewhat crenate at the apex; fruitlets rounded-obovoid or orbicular, to 3-3.5 mm long, laterally compressed, glabrous, with a canaliculate border, carinate, the beak often somewhat displaced, short, to 0.3-1 mm long, straight, rarely somewhat twisted from base, proximally broad, with short-hamate tip; receptacle hairy. May-June (August). (Plate XXIX, Figure 2, a-c).

Dry valley meadows and dry floodplain meadows, sometimes solonchik and turning into steppe; steppe meadows with forb cover, meadow slopes, gullies, roadsides, edges of fields, railroad tracks, occasionally in open broadleaf and mixed, rarely in coniferous forests, forest clearings and forest margins, mainly in the forest and forest-steppe zones and mountains to 1,500 m. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U.V., V.-Kama, U.Dnp., M.Dnp., V.-Don, Transv., Bl. (N. part, single find), L. Don, L. V., Urals; W. Siberia: all regions; E. Siberia: Ang.-Say.; Centr. Asia: Dzu.-Tarb., T. Sh. Gen. distr.: Scand., Centr. and Atl. Eur., Balkan Peninsula (Serbia, Rumania, Bulgaria). Described from Scandinavia. Type in London.

Note. A very variable species requiring further study. In the southern part of the forest and forest-steppe zones and, to some extent, also in the southern part of the steppe zone, there occurs a distinct form (*R. schen-nikovii* Ovcz. sp. nova.) with very marked leaf dimorphism: most of the first leaves have broad oblong-cuneate dentate-incised segments, and are not tripartite to the very base, while the remaining leaves are deeply divided or trisected into narrow multipartite, often petiolate, segments, as in the type form *R. polyanthemus* less strongly pubescent, with shorter spreading hairs or even glabrate (*f. volgensis* Ovcz.), the beak of its fruitlets is short with a hamate tip. Recorded from the floodplains of the Volga (Ul'yanovsk District), Don, and Irtysh, at springs, on banks of rivulets, etc. This plant occurs in the forest-steppe zone of both the European and Asiatic parts of the USSR as far as the Dzungarian-Tarbagatai area and even Tien Shan; it is very often determined as *R. polyanthemus* var. *nemorosus* auct. (Plate XIX, Figure 5, a-c).

83. *R. meyerianus* Rupr., Fl. Cauc. I, (1869), 25 in nota sub *R. dissecto* M.B. — *R. polyanthermos* Rupr., Fl. Cauc. I, (1869), 16 (non L.); N. Busch in Fl. cauc. crit. III, 3. — *R. polyanthemus* var. *latifolius* Rupr., l.c., p. 16; ex pte. — Exs.: Callier, it. taur. No. 52 (sub nom. *R. polyanthemus*).

Perennial; rootstock short, stout, with numerous rather stout cordlike fibers; stems rather stout, often with dark grayish brown remnants of dead leaves, densely covered with distant retrorse long setose rufous hairs, branched, with more or less numerous flowers; radical leaves long-petioled, the petioles — like the stems — covered with spreading hairs, broadened into a coriaceous hairy sheath, the blade more or less rounded-cordate, with long appressed hairs on both surfaces, especially beneath, tripartite to base or almost to base, rarely trisected, the middle segment subsessile or petiolate, more or less broadly rhombic, tripartite to the middle or beyond, with noncontiguous, oblong apically broadened and dentate-incised lobes, the lateral segments sessile, irregularly broad-rhombic in outline, more or less deeply bipartite, sometimes almost to base, with cuneate, apically broadened 1-2-fid incised lobes; very often there are, besides the leaves described above, leaves with a tripartite blade and with lobate-incised or dentate-incised segments; base of leaf blade mostly broadly and triangularly notched; lower leaves often petiolate, their segments more divided into narrow oblong acutely dentate-incised lobes; upper leaves 3-4-partite to base, with linear-lanceolate entire or dentate-incised lobes; all cauline leaves with an amplexicaul sheath densely

covered with setose hairs; peduncles sulcate, densely appressed-hairy; receptacle covered with short setose hairs; flowers large, 2.4–2.7 cm in diameter; petals obovate, cuneate, slightly emarginate or crenate; sepals ovate-elliptic, bordered, densely covered with spreading yellowish hairs; fruitlets 2.5–3.5 mm long, ovoid-oblong or ovoid, glabrous, with narrow borders, laterally compressed, passing more or less gradually into a short proximally broad beak 0.2–0.5 mm long, triangular in outline, straight, its tip very short-curved in immature fruitlets but subsequently straight. May–July. (Plate XXIX, Figure 4, a–c).

Oak, beech, and pine forests, clearing, forest glades, shrubs, meadows, and in mountains to 1,350 m. — European part: M. Dnp., Bl., L. V., Crim.; Caucasus: all regions except Tal.; Centr. Asia: Mtn. Turkm. Endemic. Described from the Crimea. Type in Leningrad.

Note. This species is very closely related to *R. polyanthemoides* (Boreau, Flore de Centre de la France, ed. 3, tab. I, 1857), from which it is distinguished by the almost straight broad beak of its fruitlets and by the denser and longer hairs of the stems and petioles. Forms with a tripartite broad-segmented leaf somewhat resemble *R. nemorosus* DC., to which this species has been referred by Boissier, Lipskii and Pachoskii, and from which it is, however, clearly distinguished by the short broad not spirally coiled beak and the dense rigid covering of hairs.

84. *R. nemorosus* DC., Syst. I, (1818), 280; Ldb., Fl. Ross. I, 42, ex pte. — *R. polyanthemus* ssp. *nemorosus* Shmal'g., Fl. Yugo-Zap. Ross. I (1886) 14; Fl. I, 122; N. Busch in Fl. cauc. crit. III, 3, 151. — Ic.: Rchb., Ic. Fl. Germ. IV, (1838–1839), tab. 18.

Perennial, 30–50 cm high; rootstock abbreviated, with a bundle of slender cordlike fibers; stems erect, branched, more or less few-flowered; peduncles long, unequal, sulcate, appressed-hairy, covered with spreading rarely appressed (f. *adpressepilosus* Ovcz.) white or somewhat golden hairs often somewhat retrorse from the base, rarely glabrous (var. *glabrescens* Ovcz.); radical leaves long-petioled, the petioles with spreading hairs passing into a coriaceous hairy sheath with prominent veins, the leaf blade cordate-rounded in outline, rarely almost rounded-reniform, due to a slightly notched broad or straightened base, tripartite to beyond the middle, rarely almost to base, with cuneate more or less rhombic or obovate-rhombic segments apically 2–3-fid — especially the lateral segments — coarsely and obtusely dentate; lower cauline leaves sessile, deeply 3–5-partite, with oblong-lanceolate acutely dentate-incised lobes, upper leaves 2–4-partite, with linear or linear-lanceolate lobes, all leaves appressed-hairy on both surfaces, especially above, sericeous beneath; flowers 2–3 cm in diameter; sepals oblong-obovate, obtuse, with a yellowish scarious border, spreading, covered with long hairs; petals obovate, cuneate, crenate at the apex; fruitlets 3.6–4 mm long, obovoid, laterally compressed, glabrous, canaliculate-bordered, carinate, the slender beak to 1–1.4 mm long, straight, distally rounded; receptacle hairy. June–July. (Plate XXIX, Figure 1, a–c).

Scrub and forests: mainly broadleaf, rarely pine forests, forest clearings and forest meadows. — European part: U. Dnp., M. Dnp., Bl.; Caucasus: Cisc. Gen. distr.: Centr. Eur. Described from Europe. Type in Geneva.

Note. In the USSR there occurs a not quite typical form with shorter beaks (of fruitlets).

Cycle 8. *Bulbosi* Ovcz. — Annuals with tuberously thickened stems or biennials without thickenings; sepals recurved; middle segment of trisected radical leaves petiolate; fruitlets canaliculate-bordered, more or less flat, smooth or bordered with punctiform tubercles.

85. *R. bulbosus* L., Sp. pl. (1753) 778; Ldb., Fl. Ross. I, 44; Shmal'g., Fl. I, 21. — Ic.: Müller, Ic. pl. Daniae et Norveg. IV (1777) tab. 551; Rechb., Ic. Fl. Germ. f. 4611. — Exs.: HFR No. 1302.

Perennial, to 15–75 cm high; rootstock almost undeveloped; stems with a proximal rounded tuberous thickening bearing a bundle or more or less long thickened cordlike fleshy roots, covered with spreading flexuous hairs, with one or few flowers; radical leaves with long petioles covered with spreading hairs, the blade rounded-pentagonal in outline, tripartite to base, the lateral segments sessile, the middle segment with a broadened petiolule, all segments 2–3-fid, with dentate subacute lobes, the blade hairy, especially beneath; cauline leaves few, sessile, tripartite to base or almost to base, with oblong-cuneate apically broadened trifid and often dentate segments; peduncles appressed-hairy; flowers large, to 2.5 cm in diameter, yellow, with 5 petals; sepals recurved, hairy beneath; receptacle oblong, slightly hairy; fruiting head more or less oval; fruitlets flat, rounded-obovoid, with a greenish costate border, the beak short, straight or somewhat recurved, proximally broadened, distally somewhat hamate-curved. April–June.

50 Dry sandy localities, dry-valley and seashore meadows, coastal dunes, edges of fields, dry slopes, sometimes in pine forests and among shrubs. — European part: Kar.-Lap., Lad.-Ulm., U. V., U. Dnp., M. Dnp.; Caucasus: Cisc., Dag., W., E., and S. Transc., Tal. Gen. distr.: Scand., Centr. Eur., Med., Bal.-As. Min., Arm.-Kurd., Iran, N. Am. (introduced). Described from Europe. Type in London.

Note. There are records of hybrids with *R. acer* L. and *R. polyanthemus* L.

86. *R. pseudobulbosus* Schur, Verh.-Sieb., Ver. Natur. (1853) 29; Ej. in Oest. Bot. Zeit. (1861) 250. — *R. sardous* Crantz, Stirp. Austr. II (1763) 84, ex pte. — *R. philonotis* Ldb., Fl. Ross. I, 46 (non Ehr.). — *R. sardous* var. *laevis* Čelak. ex Shmal'g., Fl. Yugo-Zap. Ross. (1886) 11; Schmal'g., Fl. I, 21; N. Busch in Fl. cauc. crit. III, 3, 138; Grossg., Fl. Kavk. II, 111. — Exs.: Herb. Norm. ed. Dörfler No. 4449.

Perennial, 10–30 cm high; stems and leaves covered with spreading hairs; radical leaves ternately or biternately dissected, their segments trifid or trisected, incised-serrate-dentate, the middle segment mostly long-petioled, occasionally the middle lobe of segments petiolate; peduncles sulcate; sepals recurved; flowers 1.0–2.1 cm in diameter; petals 7–12 mm long; receptacle hairy; fruitlets strongly compressed, 2–3 mm long, rounded, bisulcate-bordered, smooth, glabrous, the beak short, to 0.6–1 mm, broadened proximally, distally somewhat recurved or straight. June–August.

Damp and moist meadows, river valleys, sometimes muddy places which subsequently dry out, and edges of fields. — European Part: U. Dnp., M. Dnp., Bl., Crim.; Caucasus: W. Transc. **Gen. distr.:** Scand. (SW Sweden), Centr. Eur., Med., Bal.-As. Min. Described from Austria.

87. *R. sardous* Crantz, Stirp. Austr. II (1763) 84; Schmal'g., Fl. I, 11. — Ic.: Hegi, III. Fl. III, 555, f. 690.

Annual, closely related to the preceding species, from which it is distinguished by its fruitlets, being thickly covered with a row of punctiform tubercles along their sharply sulcate borders. June–August.

Meadows. — European Part: U. Dnp.: confined to the Zhitomir area. **Gen. distr.:** Centr. Eur. Described from Austria. Type in Vienna.

Cycle 9. *Reflexisepali* Ovcz. — Tuberous thickenings absent; stems covered with spreading or appressed rigid, sometimes golden hairs, rarely soft-pubescent; all segments sessile, more or less broad; sepals recurved; fruitlets bordered.

Series 1. *Neapolitani* Ovcz. — Plants covered with rigid white hairs; fruitlets with a wide border and a very short almost straight beak; receptacle hairy.

451 88. *R. neapolitanus* Ten., Ind. Sem. hort. Nap. (1825) in adnotat. 11; Fl. Napol. IV (1830) 349. — Ic.: Ten., Fl. Napol. tab. 148. — Exs.: Heldreich, Herb. Graec. Norm. No. 902; Fl. exsic. austro-hungar. No. 1716.

Perennial, mostly to 15–35 cm high; roots cordlike, fleshy, stout, grouped in a bundle, stems mostly solitary, branched from the middle, with several to many flowers, covered like the petioles with rigid spreading, rarely appressed hairs; radical leaves long-petioled, densely appressed-hairy, broadly triangular in outline, parted almost to base into 3 broad-rhombic lobes, often contiguous and unequally rounded-dentate-incised; lower cauline leaves petiolate, parted almost to base into rhombic dentate-incised lobes, upper leaves 2–3-partite, with linear or oblong lobes; receptacle hairy; flowers 1.8–2.5 cm in diameter; sepals recurved, with scattered long hairs; fruiting head ovoid-rounded; fruitlets laterally flattened, glabrous, smooth, rounded-obovoid, with a wide more or less canaliculate border, the beak short, slightly curved, rarely almost undeveloped. April–May.

Fallows, forest margins, and juniper, beech, and mountain forests of oak (*Quercus sessiliflora*) and beech. — European part: Crim. **Gen. distr.:** Bal.-As. Min., Med. Described from Italy. Type in Naples.

Series 2. *Balkharici* Ovcz. — Plants covered with rigid golden hairs; fruitlets slightly bordered, with beak to 1–1.3 mm long; receptacle hairy.

89. *R. balkharicus* N. Busch in Trav. Mus. Bot. Ac. Sc. XIX (1926) 79. — Ic.: l. c., tab. VII (p. 81).

Perennial, (7)17–40(65) cm high; rootstock short, producing fibrous roots, bearing scattered thin fibers of dead leaves; stems mostly solitary, covered like petioles of radical leaves with spreading or reclinate, rarely more or less appressed, rigid golden yellowish hairs, canaliculate, almost simple, with 1 or 2 or several flowers or slightly branched; radical leaves long-petioled, with an elongated light-brownish sheath with prominent veins, the blade orbicular or almost rounded-pentagonal in outline, more or less cordately notched, more often base covered by lateral segments, 3.5–8 cm long, 4–9.5 cm broad, with appressed silky hairs on both surfaces, trifid for one-fourth to one-half its length into broad obovate or more or less rounded-obovate slightly separated or contiguous broadly and obtusely dentate segments, the lateral segments broader, bifid; cauline leaves 1 or 2(3), divided into slightly dentate-incised linear-lanceolate lobes; sepals recurved, yellowish green, ovate-elliptic, with rigid hairs, 8–9 mm long, with a scarious border; petals (5)6–8(11), obovate, 12–16 mm long, 8–13 mm broad; flowers 2.5–4 cm in diameter; receptacle covered with rigid hairs; fruitlets 3–3.2 mm long, more or less obovoid, glabrous, laterally compressed, the beak short, to 1–1.3 mm, annularly curved, proximally broadened, imperceptibly bordered. June–July.

Subalpine and alpine meadows and sometimes tussocks in sedge bogs or remains of birch forests at 1,800–2,600 m. — Caucasus: Gr. Cauc., E. Transc. (South Ossetia). Described from Balkariya. Endemic. Type in Leningrad.

Series 3. *Villosi* Ovcz. — Plants covered with rigid white hairs; fruitlets narrowly bordered, with beak to 2 mm long; receptacle glabrous.

90. *R. constantinopolitanus* Urv., Enum. pl. Archip. (1822) 61; Boiss., Fl. Or. I, 49; N. Busch in Fl. cauc. crit. III, 3, 144. — *R. lanuginosus* var. *constantinopolitanus* DC., Syst. I (1818) 291; Prodr. I (1824) 37. — *R. tauricus* Freyn, (non Pall.) in Bull. Herb. Boiss. 2 ser. I (1901) 248. — Exs.: Herb. norm. Dörfl. No. 4445 (sub. n.m. *R. tauricus* Freyn); Fl. cauc. exs. No. 133.

Perennial, to 60 cm high; rootstock abbreviated, straight, with a bundle of rigid cordlike fibers; stems and petioles densely covered with spreading, somewhat setose oblique dull hairs; stems strong, stout, branched, many-flowered; peduncles rounded, appressed-hairy, not sulcate, in groups of 2, 3, or several, forming subcorymbiform inflorescences; radical leaves rounded-pentagonal in outline, tripartite to beyond the middle or almost to base, their segments broad-rhombic, acutely or obtusely incised-dentate, approximate or contiguous, with prominently veined sheaths; cauline leaves (except the lowermost) sessile, tripartite, their segments mostly oblong-lanceolate, rarely incised-dentate; flowers 2.5–3 cm in diameter; sepals hairy, recurved; petals 13–15 mm long, obovate; fruitlets broadly rounded-obovoid, laterally flattened, narrow-bordered, 1.5–2 mm long, the short beak hamate, to 2 mm long, straight from base, gradually narrowing to a hamately involute tip. April–May.

Shady oak and beech forests. — European part: Crim.; Caucasus: Cisc. (rare in W. part), W. Transc. (in NW part, rare). Gen. distr.: Bal.-As. Min. Arm.-Kurd., Iran. Described from Turkey. Type in Paris.



PLATE XXIX. 1 - *Ranunculus nemorosus* DC., radical leaf, 1b) fruiting head, 1c) fruitlet; 2 - *R. polyanthemus* L., 1a) blade of radical leaf, 2b) fruiting head, 2c) fruitlet; 3 - *R. submarginatus* Ovcz., radical leaf, 3b) fruiting head, 3c) fruitlet; 4 - *R. meyerianus* Rupr., base of plant with first radical leaf, 4a) blade of subsequent radical leaves, 4b) fruiting head, 4c) fruitlet; 5 - *R. schennikovii* Ovcz., radical leaf, 5b) fruiting head, 5c) fruitlet.

91. *R. villosus* DC., Syst. I (1818) 283; Prodr. I, 38. — *R. lanuginosus* C. A. M., Verz. Cauc. I (1831) 202, non L.; Ldb., Fl. Ross. I (1842) 42, ex pte. — *R. constantinopolitanus* var. *persicus* Boiss., Fl. Or. I (1867) 49; N. Busch in Fl. cauc. crit. III, 3, 144; Grossg., Fl. Kavk. II, 144. — *R. lanuginosus* N. Busch in Fl. cauc. crit. III, 3 (1903) 143 (non L.) excl. pl. *tauricae*.

Perennial, 35–60 cm high, with a bundle of profuse cordlike thickened, large, exuberantly developed roots; stems and petioles densely covered with rigid setose lustrous-white spreading retrorse long hairs; stems many-flowered, long-branched, with flowers in almost verticillate semicorymbs; leaves large, 7–14 cm long, 9–16 cm broad, especially beneath with long dense setose hairs, with 3 broad-rhombic approximate or contiguous coarsely dentate and incised-lobate segments; flowers 3 cm in diameter; sepals retrorse or spreading, densely covered with very long rigid hairs; fruiting head loose; fruitlets 5–5.5 mm, laterally flattened, with slightly convex sides, glabrous, smooth, more or less narrowly subobtusely bordered, the beak elongated, to 2 mm, slender, somewhat curved from base, with circinate tip. April–May.

Among shrubs and in damp meadows, to 900 m. — Caucasus: E. Transc., Tal. **Gen. distr.:** Iran. Described from Iran. Type in Geneva.

Series 4. *Anemonifolii* Ovcz. — Plants covered with soft white hairs or glabrate; fruitlets slightly bordered, with a very short beak (to 0.3–0.5 mm); receptacle glabrous; sepals recurved.

92. *R. anemonifolius* DC., Syst. I (1818) 282; Prodr. I, 37; N. Busch in Fl. cauc. crit. III, 3 (1903) 145 ex pte. — *R. calverti* Boiss., Diagn. Ser. II, V (1856) 8. — *R. anemonaefolius* β *calverti* Boiss., Fl. Or. I (1867) 50.

456 Perennial, small, 12–25 cm high, glabrate or slightly pubescent; stems 1–3, simple or slightly branched, slender, sometimes curved, glabrate or covered with more or less spreading or semiappressed slender silky hairs, with one to several flowers; radical leaves more or less short-petioled, the petiole glabrous or covered with semispreading fine white hairs, the blade ovate or ovate-triangular in outline, parted almost to base or to lower one-fifth into distant lanceolate-oblong segments, the middle segment 3–4-incised-lobate, with entire or very few toothlike lobes, oblong-rhombic, cuneate, rarely subentire, the lateral segments of similar shape, more or less irregularly oblong, 2–3-incised-partite with few teeth, the leaf blade glabrous or especially beneath, with slender appressed hairs, the base rounded, rarely somewhat cuneate or slightly notched; cauline leaves mostly slightly developed, sessile, tripartite, with entire or deeply cleft segments, the upper leaves 2–3-partite, with linear or else entire linear lobes; peduncles slender, often more or less flexuous, slightly and finely sulcate, with weak short appressed hairs, elongating in fruit; flowers 1.5–2.5 cm in diameter; petals obovate, often with an irregular upper margin; sepals hairy; fruiting head globose, firm, sometimes with persistent sepals; fruitlets 3.5–3.8 mm long, obovoid, laterally flattened but with slightly convex sides, glabrous, smooth, slightly bordered, the beak very short, to 0.3–0.5 mm, broad from base, gradually tapering to a hamately involute tip. June–July.

Damp subalpine and alpine meadows, on southern slopes near springs at 2,000–3,200 m. — Caucasus: S. and E. Transc. Gen. distr.: Arm.-Kurd., Bal.-As. Min. (E.). Described from Turkey (Cappadocia). Type in Paris.

93. *R. elegans* C. Koch in Linnaea XV (1841) 248; Grossg., Fl. Kavk. II, 115. — *R. constantinopolitanus* C.A.M., Verz. Pflz. Cauk. (1831) 202, non d'Urv.; Ldb., Fl. Ross. I, 43. — *R. anemonaefolius* N. Busch in Fl. cauc. crit. III, 3 (1903) 145, non d'Urv. (ex pte). — Exs.: HFR No. 1701.

457 Perennial, 20–45 cm high, covered with soft silky white hairs; roots cordlike, firm, thickened; stems mostly 2 or 3, proximally much thickened and profusely covered with dark brown fibers of dead petioles, branched, with more or less numerous flowers, densely covered with spreading often somewhat retrorse slender and more or less soft white hairs; radical leaves covered with long white silky hairs on both surfaces, more densely so beneath, more or less ovate-triangular in outline, tripartite to base or almost to base — rarely less deeply — with 3 unequally dissected incised-dentate segments, the middle segment more or less rhombic, cuneate, more or less uniformly dissected into 3 subobtusely incised-dentate oblong lobes, the lateral segments irregularly rhombic, unequally 2–3-fid, segments mostly more or less approximate or almost contiguous, with base of blade covered by contiguous segments; cauline leaves sessile, mostly with dense silky hairs, tripartite, with broad-lanceolate dentate-incised segments; peduncles covered with short flexuous hairs; flowers in semicorymbose inflorescences, large, 2.5–3 cm in diameter; sepals recurved; petals to 17 mm long, obovate, sometimes slightly emarginate; fruiting head oval; fruitlets 3–3.3 mm long, rounded-obovoid, (laterally) flattened, slightly bordered with short beak, 0.3–0.6 mm long, broad from base, with short hamate tip. June–July.

Alpine and subalpine meadows and pastures at 1,800–2,700 m. — Caucasus: Cisc., Dag., W., E., and S. Transc. Endemic. Described from the Caucasus (Somkhetiya). Type in Leningrad.

Note. Meyer has linked this species with *R. constantinopolitanus* Urv., from which it is, however, clearly distinguished by the almost obsolete beak of the fruitlets, the small fruitlets, the soft pubescence, and the larger flowers. The species most closely related to *R. elegans* appears to be *R. anemonifolius*, from which it is distinguished by stronger pubescence, broad and strongly incised-dentate leaf segments, and more numerous flowers. Several authors confuse our plant with *R. kotschyi*, from which it is clearly distinguished by its broad incised leaf segments as well as by its pubescence.

Series 5. *Obesi* Ovcz. — Stems covered with scattered appressed hairs; base of leaf blade rounded or cuneate, entire, the blade tripartite with dentate ovate segments; receptacle glabrous; beak of fruitlets to 1.3–1.4 mm long, annularly involute.

94. *R. obesus* Trautv. in A.H.P. III, 2 (1875) 275; N. Busch in Fl. cauc. crit. III, 3, 147.

Perennial; rootstock abbreviated, thickened, with a bundle of root fibers; stems tall, to 55 cm, glabrous but with scattered appressed hairs in upper part, sulcate, stout, branching in upper part; peduncles long, covered with appressed setose hairs; radical leaves with very long sulcate glabrous petioles, the blade reniform-rounded [in outline] or more or less ovate-rounded with broadly rounded base, tripartite to the middle or somewhat beyond, with irregularly coarsely serrate-dentate segments, the lateral segments irregularly broad-ovate or broadly ovate-oblong, more or less lobate-incised and dentate, the middle segment subentire, more or less oblong, coarsely dentate, much narrower than the lateral segments, the leaf blade with prominent veins on both surfaces, especially so above, glabrous, somewhat coriaceous; lower cauline leaves (if developed) petiolate, similar to the radical leaves, upper leaves sessile, tripartite, with oblong-lanceolate or oblong-linear serrate-dentate lobes; flowers large, to 4 cm in diameter; petals rounded-ovate, emarginate, to 21 mm long, to 10 mm broad; sepals covered with long hairs, broad-ovate, recurved; (immature) fruitlets 3.5 mm long, almost rounded-ovoid, glabrous, laterally flattened; beak straight, with annularly involute tip, 1.3–1.4 mm. July.

Caucasus: S. Transc. Endemic. Described from the Akhaltsikhe area near the Turkish border. Type in Leningrad.

Note. At present only a single habitat is known for this species, which was collected only once, in 1874, by G. Radde. According to Trautvetter, it is undoubtedly closely related to *R. kotschyi* Boiss., from which it is distinguished by its less divided leaf blades and by the longer, distally rounded beak of its fruitlets.

Series 6. *Subsetosi* Ovcz. — Stems covered with semiappressed setaceous hairs; blade of radical leaves basally rounded or cuneate, flabellately tripartite almost to base; receptacle glabrous; fruitlets with a very short curved beak.

95. *R. kotschyi* Boiss. in Kotschy, Pl. Pers. exs. febr. 1845; Diagn. Ser. 1, VI (1845) 5; Fl. Or. I (1867) 50. — *R. anemonefolius* var. *kotschyi* Boiss., Suppl. Fl. Or. (1888) 13; N. Busch in Fl. cauc. crit. III, 3, 146.

Perennial, 40–55 cm high; rootstock stout, abbreviated, straight, with a bundle of cordlike firm stoutish fibers, the collar more or less profusely covered with long slender fibers of old petioles; stems mostly solitary, strong, stoutish, hollow, erect, sharply sulcate, distally branched, glabrous from base, often covered with scattered semiappressed recurved or reclinate slightly spreading hairs or with more or less spreading rigid setose hairs; radical leaves long-petioled, the petiole with a large elongated tapering sheath with scattered semidistant setose hairs, the leaf blade glabrous above, rarely with scattered short appressed hairs, the underside remotely hairy, cuneate or basally rounded, ovate-cuneate or ovate-reniform in outline, flabellately tripartite to base or almost to base, the segments sessile or the middle segment broad-petioled, all segments cuneate, oblong-lanceolate or cuneate [sic!], glabrous at the apex, the lateral segments bisected to beyond the middle, the middle segment trisected into

lanceolate subobtusate or acuminate entire or coarsely 2-3-dentate lobes; cauline leaves sessile, tripartite, with entire, rarely remote spreading-dentate linear lobes passing into narrow hairy sheaths; peduncles elongated, somewhat sulcate in lower part, with appressed short hairs; flowers yellow, 2.5-3.3 cm in diameter; petals obovate, slightly notched or rounded; collective fruit oval-rounded; receptacle glabrous; fruitlets
459 large, to 5 mm long, obovoid, flat, punctate (when mature!), narrow-bordered, the beak very short, oblong-curved, truncate-tipped, one-sixth of the length of the fruitlets proper or less. July.

Damp and boggy meadows; gardens. — Caucasus: E. and S. Transc.; Centr. Asia: Mtn. Turkm. **Gen. distr.:** Arm.-Kurd., Iran. Described from southern Iran. Type in Geneva; cotype in Leningrad.

Cycle 10. *Dissectifolii* Ovcz. — Leaves 2-4-pinnatipartite, with sessile 2-3-partite segments with linear-oblong lobes.

96. *R. dissectus* M.B., Fl. taur.-cauc. II (1808) 25; Ldb., Fl. Ross. I, 43; Boiss., Fl. Or. I, 42; N. Busch in Fl. cauc. crit. III, 3 c, 161. — Exs.: HFR No. 1356.

Perennial, 16-20 cm high; rootstock slender, short, sometimes almost obsolete, with a bundle of slender roots; stems solitary, erect or somewhat ascending, covered from base (at base sometimes glabrate) with long weak white spreading or semiappressed hairs, simple or slightly branched, 1 or 2-flowered; radical leaves multipartite, with short petiole covered with long weak spreading or appressed hairs, sometimes capitate, the blade ovate or rounded-ovate in outline, mostly 2-3(4)-pinnatipartite into deeply 2-3-partite segments with entire, 3-incised-dentate, lanceolate or oblong or oblong-lanceolate lobes tapering to base, the lateral segments subsessile or sessile, the middle segment petiolate; the petioles with elongated somewhat scarious-margined sheaths, the leaf blade with some long silky hairs above and scattered hairs beneath, rarely glabrate; cauline leaves little developed, sessile, mostly deeply 2-3-palmatipartite, with entire linear or linear-lanceolate lobes, sometimes the lowermost leaf petiolate, tripartite, with acutely dentate and incised segments; flowers 2-3 cm in diameter; sepals divergent, hairy, obtuse; petals obovate or oblong-obovate; receptacle with an apical tuft of short hairs; fruitlets 3-3.5(4) mm long, elliptic, glabrous, laterally flattened, somewhat convex when mature, with several short veins along upper margin below the beak; the beak short, to 0.8-1 mm, straight, with hamate tip. May-June.

Gravelly and stony localities. — European part: Crim. Endemic. Described from the Crimea. Type in Leningrad.

97. *R. huetii* Boiss., Diagn. plant. Ser. II, V (1856) 7; Fl. Or. I, 43; Suppl. 11; N. Busch in Fl. cauc. crit. III, 3, 161.

460 Perennial, mostly 7-10 cm, rarely to 19 cm high; rootstock almost obsolete, with cylindric cordlike-thickened roots, the crown somewhat white-hairy, covered — like base of stems — with a compact fibrous jacket of decayed dead leaves; stems 1 or 2, simple, 1-flowered, usually branched below the middle, 2-4-flowered, ascending, hairy-tomentose with soft white long silky tangled hairs; radical leaves short-petioled, the petiole usually

much shorter than the blade, covered with soft semiappressed long white hairs, passing into elongated broad overlapping sheaths, the leaf blade with white silky hairs, ovate, 3-4-pinnatipartite, the 3-4 lateral segments sessile, deeply 2-3-partite, with long linear-oblong lobes with divergent apical teeth; cauline leaves sessile, deeply 2-3-partite, with entire linear or linear-lanceolate lobes, the uppermost sometimes obsolete, otherwise entire, linear; sepals oblong-ovate, obtuse, long-hairy; petals obovate or rounded-obovate, about twice as long as sepals; flowers 2-2.5 cm in diameter; peduncles glabrate, slightly hairy distally; fruitlets 3.5-4.5 mm long, with a short (0.5-0.7 mm) outward curved beak, irregularly obovoid, with a row of more or less parallel veins visible with a hand lens, of which the two most prominent are united at the base; surface of fruit distinctly alveolate, glabrous. June-July.

Alpine meadows. - Caucasus: S. Transc. (Akhaltzikhe District). **Gen. distr.:** Arm.-Kurd., Bal.-As. Min. (E. Adzharia). Described from Turkey. Type in Geneva.

Cycle 11. *Acri Ovcz.* - Sepals spreading; receptacle glabrous; leaves tripartite to or beyond the middle, if to the base then segments always quite sessile, usually broad or lanceolate, producing an apparently quinquepartite blade; fruitlets flattened, mostly slightly bordered.

Note. Various species of this cycle require a thorough study. These provisionally assigned to it may be divided into 4 basic groups.

1. *Protracti Ovcz.* - with glabrous or appressed-hairy stems and obsolete rootstock (*R. acer*, *R. propinquus*, *R. glabriusculus*, *R. subcorymbosus*, *R. jacuticus*).
2. *Patentes Ovcz.* - with spreading-hairy stems, often with well developed creeping rootstock (*R. boreali*, *R. lanuginosiformis*, *R. lanuginosus*, *R. smirnovii*, *R. grandifolius*, and perhaps *R. japonicus*).
3. *Sericei Ovcz.* - with appressed-hairy stems entirely covered with leaves of similar shape and a well developed rootstock (*R. stevenii*, *R. baldshuanicus*).
4. *Viridifolii Ovcz.* - with more or less glabrous stems and a well developed rootstock; shape of cauline leaves sharply contrasted with the radical leaves (*R. laetus*).

461 The above subdivisions provide only a tentative basis for an exhaustive analysis of the entire cycle and for the clarification of the interrelation of the varieties concerned.

98. *R. acer* L. Sp. pl. (1753) 554; DC. Prodr. I, 36; Ldb., Fl. Ross. I, 40; Schmal'g., Fl. I, 92. - Ic.: Rchb., Ic. Fl. Germ. IV (1838-1839) t. 16 bis, 17. - Exs.: Herb. Normale edit. Dörfler No. 4444; Fl. Bohemiae et Moraviae exsicc.; Petrak, Mähr ed 1, f. XII, No. 1130.

Perennial, 30-70 cm high; rootstock undeveloped; roots in a compact bundle; stems sulcate, appressed-hairy or glabrate proximally, with long more or less declinate branches, many-flowered; radical and lower cauline

leaves with petiole passing into an elongated glabrous or hairy sheath, the blade rounded, more or less pentagonal [in outline], glabrous or with scattered hairs above and scattered hairs beneath, 5-palmatisect almost to base, with oblong-rhombic or oblong-lanceolate lobes, these deeply incised into lanceolate or linear acute entire, usually dentate lobules; the upper leaves sessile, tripartite, with linear incised-dentate lobes; peduncles sulcate, appressed-hairy; flowers golden yellow, 1.5–2 cm in diameter, with 5-merous calyx and corolla; sepals ovate, more or less appressed-hairy, spreading, 4–7 mm long; petals lustrous above, broad-obovate, 7–10 mm long; receptacle glabrous; fruiting head globose; fruitlets obliquely ovoid, rounded, smooth, laterally flattened, with narrow borders, to 2.5 mm long; the beak very short, almost straight, proximally broadened, sometimes with recurved tip. May–August.

Inundated and dry-valley meadows; a weed of cultivated and fallow fields and pastures, sometimes in boggy herbaceous habitats, and rarely penetrating into open birch forests and felling areas. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. Dnp., M. Dnp., V.-Don, Transv., Bl., L. Don, L. V., Urals; Caucasus: Cisc.; W. Siberia: Ob, U. Tob., Irt., Alt.; Centr. Asia: Dzu.-Tarb.? **Gen. distr.:** Centr. Eur. Described from Europe. Type in London.

99. *R. propinquus* C. A. M. in Ldb., Fl. Alt. II (1830) 332; Ldb., Fl. Ross. I, 40. — *R. borealis* Trautv. in Bull. Soc. Nat. Mosc. XXXIII (1860) 72, ex pte.

462 Perennial, 8–30 cm high; roots fiberlike, fascicular, sometimes root-stock developed, obliquely abbreviated; stems simple or short-branched in upper part, sulcate or with obscure furrows only near the flowers, mostly with one to several flowers, covered with appressed short setose straight hairs, rarely glabrous from base; leaves glabrous or glabrate, light green above, with appressed somewhat silky hairs or glabrate beneath; radical leaves petiolate, the petioles with upright hairs and short broadened sheaths, the blade reniform-rounded in outline, cordate or cuneate, sometimes with basally contiguous lobes, deeply tripartite, the middle lobe basally somewhat cuneate-obovate, incised-serrate with subobtuse teeth, the lateral lobes broader, unequally bifid and dentate-serrate; cauline leaves few, sessile, with the exception of the lowermost leaf sometimes short-petioled, palmatisect, with 3–5 segments, those of lower leaves oblong, acutely dentate-incised, segments of upper leaves linear, entire or almost dentate, mostly tapering to base; flowers 1.8–2.5 cm in diameter, golden; sepals divergent or even somewhat reflexed, oblong-ovate, very densely covered with drooping hairs; petals 5–8, 2–3 times as long as sepals, obovate. June–July.

High-mountain meadows, riverbanks in the forest zone, and sometimes entering mixed and coniferous forests. — W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau. Described from Altai (near Chechulikha on the Chuya River). Type in Leningrad.

100. *R. glabriusculus* Rupr. in Beitr. zur Pflanzenkunde des Russisch. Reiches II (1845) 19. — *R. borealis* Trautv. in Bull. Soc. Nat. Mosc. XXXIII (1860) 73, ex pte. — *R. borealis* var. *glabrata* Trautv., l. c. ex pte. — *R. borealis* Kryl. in Fl. Zap. Sib. V, 1205, ex pte. — Ic.: Rupr., l. c., tab. 1.

Perennial, 10–25 cm high; roots in a loose bundle of elongated slender fibers; stems solitary, simple, 1-flowered, or else slightly branched distally with several flowers, glabrous or glabrate, rarely with scattered semi-appressed slender hairs confined to lower part, like the peduncles finely sulcate throughout, with 1–2 small bracts; radical leaves numerous or single, their slender petioles glabrous, occasionally slightly whitish-hairy, passing into slender elongated scarious glabrous sheaths, the blade more or less broadly notched basally, rounded-reniform-ovate in outline, small, to 1.1–2.2 mm long, to 1.6–3 cm broad, more or less deeply tripartite; divergent segments, the middle segment ovate, oblong, acuminate or obovate-oblong, dentate-incised, rarely entire, the lateral segments mostly remote, somewhat more broadly dentate-incised, almost bilobate, the blade ciliate-margined, glabrate or with scattered hairs on both surfaces; cauline leaves (if present) similar to the radical, sessile, tripartite, with subacute linear segments; peduncles finely sulcate, appressed-hairy; receptacle narrow, short, glabrous; flowers 1.3–1.6(2) cm in diameter, pale yellow (whitish in herbarium); sepals oblong-lanceolate or ovate-lanceolate, with a yellow border, 4–5 mm long, with appressed short hairs; petals mostly oblong-obovate, rounded; fruiting head rounded-oval, small, stamens and sepals often persistent after flowering; fruitlets 2.2–2.5 mm long, glabrous, more or less convex or slightly flattened laterally, rounded-obovoid, the beak short, to 0.5 mm, slender, straight, with hamately curved tip. July.

Arctic zone. Low-bush tundra and meadows with mixed herbaceous cover. — Arctic: Arc. Eur., Nov. Z., W. and Arc. Sib. Endemic. Described from the Bol'shezemel'skaya Tundra. Type in Leningrad.

101. *R. borealis* Trautv. in Bull. Soc. Nat. Mosc. XXXIII (1860) 73, ex pte. — *R. borealis* var. *typica* Trautv., l.c. — *R. acer* subsp. *frieseanus* Shmal'g., Fl. I (1895) 22, ex pte. — *R. propinquus* Korsh. in Tent. Fl. Ross. Or. I (1898) 16, non C.A.M. ex pte; Kryl., Fl. Zap. Sib. V, 1204, ex pte.

Perennial, 20–50 cm high; rootstock obsolete; stems mostly simple or with short branches in upper part, covered with spreading hairs, these appressed only at the very tip, rarely the stems glabrous; radical leaves with long petioles covered with spreading hairs, broadened into glabrous, rarely hairy sheaths, the blade rounded-cordate [in outline] with a narrowly notched cordate base, trisected into incised-dentate segments, the middle segment rounded-obovate or rounded-rhombic, somewhat cuneate, trifid into broad oblong dentate lobules, the lateral segments mostly broader than the middle segment, broad-obovate or rhombic-obovate, 2–3-fid into broad dentate-incised lobules, the leaf blade covered with silky hairs, especially beneath; cauline leaves — at least the lower ones — often petiolate, quadri- or pentagonal, ovate, or broad-reniform in outline, deeply 3–5-sect, with oblong or oblong-obovate dentate-incised lobes; uppermost leaves tripartite, with linear-oblong entire lobes; flowers 1.8–2.4 cm in diameter, with 5 petals and sepals; sepals appressed-hairy; petals broad-obovate; fruiting head globose; receptacle glabrous; fruitlets orbicular, laterally flattened and more or less flat, the beak ensiform, short, proximally broadened, with curved tip. May–July.

Spruce and mixed forests, birch forests and shrubs, forest margins, often in mossy soil, entering spring and flooded meadows mainly in the

forest zone, and further south in boggy localities. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, Transv., Urals; W. Siberia: Ob, U. Tob., Alt.; E. Siberia: Yenis., Lena-Kol., Ang.-Say., Dau.; Centr. Asia: Balkh., Dzu.-Tarb. Endemic. Described from the mountains of Karkarala (Mt. Kent). Type in Leningrad.

464 Note. A highly variable species. The blade shape, as well as the considerable pubescence — especially beneath — of the often conspicuously and deeply cordate radical leaves, and the spreading hairs covering the stems, bring it close to *R. lanuginosus*, from which it is clearly distinguished by smaller fruitlets with shorter beaks, smaller flowers, and sparser pubescence. Plants from the European part of the USSR are distinguished from Siberian plants by their less rounded, larger, strongly pubescent leaves, and may represent a separate variety.

102. *R. lanuginosiformis* Selin in sched. ex Fellm., Pl. Lapp. Or. (1864–1869) 3; Trautv., Incr. Fl. Ross. (1882) 21. — *R. acer* Fellm., l. c., p. 3, non L.; Trautv. in Bull. Soc. Nat. Mosc. XXXIII (1860) 73 ex p. quo ad pl. arct.; in A.H.P. I, 1, 49; Kryl., Fl. Zap. Sib. V (1931) 1205 ex p. — *R. borealis* var. *pumilis* Wahlb., Fl. Lapp. (1812) 159.

Perennial, 11–18 cm high, mostly 1- or 2-stemmed, the lower part of stems almost black or dark grayish brown owing to old sheaths; stems branched in upper part, mostly with 3–5 flowers, covered from base with spreading sometimes brownish hairs, rarely glabrate, in upper part the hairs semidistant or semiappressed, occasionally densely covered with spreading hairs; radical leaves with petioles covered with spreading hairs and passing into broadened elongated brownish scarious or somewhat coriaceous sheaths, these covered with elongated scattered semiappressed hairs and with long ciliate margins or (old petioles) glabrous, with distal auricles, the leaf blade more or less rounded-reniform [in outline], somewhat cordate or cuneate, often tripartite to one-fourth or one-fifth, rarely to one-third, the middle segment oblong-obovate or irregularly oblong-rhombic, the apex shallowly 3-dentate-incised, with a series of small subacute teeth, the lateral segments broader than the middle segment, mostly bilobate-incised, with somewhat dentate-incised lobes, the leaf blade dark green with scattered short appressed hairs above, paler green with scattered hairs beneath; cauline leaves mostly one, sessile or subsessile, with elongated hairy basally often broad light brownish sheaths, tripartite, with entire or slightly dentate linear or oblong-lanceolate segments; flowers 1.6–2.5 cm in diameter, bright yellow; sepals semiappressed, elliptic or oblong-elliptic, to 5–6.6 mm long, subobtuse, with yellowish border, appressed-hairy; petals 5–8, broadly rounded-obovate, mostly slightly emarginate or crenate, 0.8–1.2 cm long; fruitlets 2.5–2.8 mm long, oblong-obovoid, often with long isolated cilia on the underside, with straight beak, 0.6–0.8 mm, short hamately tipped.

467 Argillaceous tundra, dry sandy hills, dry grass plots, rarely river banks or flats. — Arctic: Nov. Z., Arc. Sib. Endemic. Described from Novaya Zemlya. Type in Leningrad.

103. *R. lanuginosus* L., Sp. pl. (1753) 554; Ldb., Fl. Ross. I, 42; Schmalg', Fl. I, 22; N. Busch in Fl. cauc. crit. III, 3, 143. — Ic.: Rchb., Ic. Fl. Germ. f. 4609. Exs.: Fl. Hung. exs. No. 659.



PLATE XXX. 1 - *Ranunculus muricatus* L.; 2 - *R. chius* DC.; 3 - *R. trachycarpus* Fisch. et Mey.; 4 - *R. lomatocarpus* Fisch. et Mey.

Perennial; rootstock abbreviated, obliquely truncate, almost obsolete; stems 30–80 cm high, twice or thrice branched distally, few-flowered, covered like the petioles with dense drooping or spreading long slender hairs; radical leaves pentagonal-rounded [in outline], tripartite for two-thirds or three-fourths of their length, with approached or contiguous broad-obovate acutely trifid serrate-dentate segments, densely covered with whitish silky hairs beneath, with scattered appressed hairs above, the base of blade acutely and deeply notched; lower cauline leaves similar to the radical, petiolate, upper leaves sessile or subsessile, tripartite, with narrow serrate segments; peduncles sulcate; flowers 1.6–2.6 cm in diameter, yellow; sepals divergent, hairy, half as long as the obovate 13–14-mm long petals; receptacle glabrous; fruitlets 4–4.8 mm long, broadly rounded-obovoid, strongly flattened laterally, with a thin border, glabrous, smooth, the beak long, to 1.8–2 mm, straight from base, hamate-curved distally. May–June.

Forests and shrubs; rare. — European part: M. Dnp., Bl. Gen. distr.: Centr. Eur. Described from Europe. Type in London.

104. *R. smirnovii* Ovcz., sp. nova in Addenda VI, p. 574. — *R. lanuginosus* Turcz., Fl. baic.-dahur. I (1842) 59, non L.

468 Perennial, tall, mostly strongly developed, 50–60 cm high, densely hairy; root fibers thickened, in a compact bundle; crown thin, with profuse fibers of dead leaves; stems with spreading rigidulous, basally often with rufous long hairs, branched distally, with more or less numerous flowers; radical leaves large, long-petioled, the blade broadly rounded-cordate or rounded-ovate [in outline], with a deeply notched base, to 7–9 cm long, to 13 cm broad, tripartite to beyond the middle, sometimes almost to base, with broad obovate-rhombic acutely dentate-incised segments, the middle segment often dissected almost to the middle into 3 broad oblong dentate-incised lobes, the lateral segments acutely dentate-incised, mostly bisected to the middle or beyond, the blade whitish-sericeous or pale green beneath due to a dense covering of appressed white hairs, ciliate-margined, the petioles covered with more or less rigid, often retrorse hairs, the elongated sheaths and stems almost always rufous-hairy; lower cauline leaves short-petioled, similar to the radical but more deeply dissected, sometimes the lobes of cauline leaves petiolate, the upper leaves sessile or subsessile, hairy, deeply 3–5-partite, with oblong-rhombic or lanceolate-oblong, mostly coarsely and acutely dentate, sometimes petiolate lobes; flowers mostly numerous, often in corymbose inflorescences, 2.2–3.2 cm in diameter; sepals semi-appressed or somewhat divergent, hairy, one-third to half the length of the petals; petals obovate, cuneate, more or less rounded or somewhat crenate; receptacle glabrous; fruitlets broad-obovoid, laterally flattened, with a thin border, smooth, glabrous, with ensiform, short beak, 0.6–0.8 mm, straight or sometimes twisted from base, usually curved distally. June–July.

Broadleaf and mixed forests, shore pebbles, forest meadows, willow groves and forest margins. — E. Siberia: Ang.-Say., Dau. Endemic. Described from Transbaikalia. Type in Leningrad.

Note. This species is distinguished from *R. grandiflorus* by its mostly smaller flowers and by the absence of a creeping rootstock. It differs from *R. lanuginosus* L. by the narrower segments of leaves, by stems often covered with rufous hairs below, by smaller fruitlets, but

mainly by the beaks, which equal half the length of the fruitlet proper. It is easily confused with *R. borealis* Trautv., a smaller plant whose stems are covered with slender erect-spreading short hairs; these are neither long nor rufous and never retrorse, as often happens in *R. smirnovii* Ovcz., which is, moreover, mostly a forest plant.

105. *R. grandifolius* C.A.M. in Ldb., Fl. Alt. II (1830) 330; Kryl., Fl. Zap. Sib. V (1931) 1206. — *R. lanuginosus* C.A.M. (non L.), l.c. —

Perennial, large, 30–80(100) cm high; rootstock horizontal, long, 10 cm or longer, 4–6 cm thick, glabrous, sometimes slightly hairy only at the crown; stem without fibers of dead petioles (as in *R. lanuginosus*), stout, striate-sulcate, distally branched, proximally with downward-spreading hairs, distally with appressed rigid hairs; leaves with scattered short appressed hairs or glabrate and green above, the underside light or sericeous, densely covered with appressed long silky white hairs; radical leaves long-petioled, with amplexicaul sheaths, rounded-reniform [in outline], cordate, large, 8–9 cm long, 14 cm broad, deeply palmatisect into 3–5 large, elongated, broadly oblong-rhombic segments tapering to base, approached or distally contiguous, the middle segment mostly somewhat narrower than the lateral, unequally deeply acutely incised-serrate, with upward-pointing teeth, or else more or less deeply almost 2–3-incised into serrate lobes, the lateral segments more or less deeply dissected, acutely serrate-incised; upper leaves more deeply divided into oblong-elliptic acutely and unequally serrate-incised sessile or subsessile segments, segments of uppermost leaves linear-lanceolate, entire or subentire; flowers 2–3.2 cm in diameter, golden yellow, usually in a subcorymbose inflorescence, spreading or semiappressed, 6–8(9) mm long, elliptic, with silky hairs; petals 5–6 (sometimes 7 or even 10–11), rounded-obovate, 11–15 mm long; receptacle glabrous; fruitlets obovoid, 3.5–4 mm long, glabrous, laterally flattened, with a distinct dorsal border, the beak 0.5–0.8(1) mm long, hamate-curved distally, rarely curved from base with hamate tip. June–August.

Subalpine meadows, apparently most frequent in damp places, riverbanks, forest meadows, and forests of the forest zone. — W. Siberia: Alt.; E. Siberia: Ang.-Say.; Centr. Asia: Dzu.-Tarb., T. Sh. Gen. distr.: Dzu.-Kash. Described from Altai. Type in Leningrad.

106. *R. subcorymbosus* Kom. in Fedde, Repert. XIII (1914) 234; Fl. Kamch. II (1929) 145. — *R. acer* subsp. *japonicus* Hultein, Fl. Kamtch. II, 120, non Maxim.

Perennial, to 40 cm high; rootstock obsolete; stems one or several, more or less hollow, glabrous, smooth or else distally covered with scattered appressed or semiappressed slender inconspicuous hairs, sulcate, distally branching, inflorescence cymose, with peduncles arising in groups of 2–3, radical leaves petiolate, orbicular or reniform [in outline], more or less broadly cordate-notched, 3–5-incised-lobate, the lobes not approximate, broadly oblong-rhombic or oblong-elliptic, the lateral lobes broader and asymmetric, acutely serrate-dentate, the petioles covered with appressed or semiappressed slender hairs, the blade paler with scattered appressed slender hairs, even sparser above; lowermost cauline leaves short-petioled, similar to the radical but more deeply divided, with large slightly

hairy amplexicaul sheaths, the uppermost leaves sessile, tripartite or trisected into oblong or lanceolate entire, more often acutely dentate sessile or petiolate (f. *umbrosus* Kom.) segments, hairy; peduncles appressed-hairy, not sulcate; flowers large, 2–2.5 cm in diameter, more or less numerous, golden yellow; sepals more or less villous, oblong-ovate, obtusely rounded, with a yellow border, divergent, some recurved; petals 5, rarely to 7, broad-obovate, truncate-rounded or even slightly emarginate; receptacle glabrous; fruitlets 3.5–4 mm long, more or less oblong-obovoid, laterally flattened, the beak short, to 1 mm, straight, the short hamate-curved tip finally drying out. August. (Plate XXVII, Figure 3, a–d).

470 Damp alpine meadows and penetrating to pebbly valleys of montane rivers down to the forest zone (together with *Betula ermani* Cham.). – Far East: Kamch. Endemic. Described from Kamchatka. Type in Leningrad.

107. *R. jacuticus* Ovcz., sp. nova in Addenda VI, p. 575.

Perennial, 20–40 cm high; rootstock short, thickened, vertical, with elongated stoutish fibers or almost obsolete; stems one or several (2 or 3), almost simple or branched from their lower part, hollow, glabrous, sulcate, rather few-flowered; radical leaves long-petioled, cordate, deeply tripartite often almost to base, with oblong-obovate somewhat cuneate spreading segments, the lateral segments broader and asymmetric, mostly more or less deeply bifid and acutely palmatifid [sic!] with a large central tooth, the blade glabrous or with appressed, rarely spreading hairs, the petioles glabrous, rarely with scattered semicontiguous long slender weak hairs; lower cauline leaves (if developed) more or less similar to the radical, short-petioled, with elongated semiamplexicaul glabrous or slightly hairy sheaths; upper cauline leaves sessile, 2–3-partite, with linear-lanceolate lobes, almost petiolate; peduncles appressed-hairy, mostly weak, seminutant or curved, 1.8–2.8 cm mostly with 6 petals [sic.]; sepals semiappressed or somewhat divergent, hairy, more or less ovate, obtuse; petals broad-obovate, rounded or somewhat crenate-notched at the apex, twice as long as sepals; fruitlets 3.5–4 mm long, obovoid, with a thin dorsal border, laterally flattened, smooth; beak slender, 1–1.2 mm long, straight or somewhat curved from base, with a broadly hamate-recurved tip. May–July. (Plate XXVII, Figure 4).

Meadow and boggy-meadow localities, banks of rivers, and small lakes. – E. Siberia: Lena-Kol. Endemic. Described from Yakutia (from the Lena River valley near Bulun). Type in Leningrad.

108. *R. japonicus* Thunb. in Transact. of Linn. Soc. II (1794) 337; Kom., Fl. Manchzh. II, 1, 295. – *R. propinquus* Maxim., Prim. Fl. Am., 20, non C.A.M. – *R. acris* var. *japonicus* Maxim., Enum. pl. Mongol. (1889) 21 (ex pte). – *R. acer* var. *steveni* Korsh. in A.H.P. XII (1888) 297, ex pte.

Perennial; rootstock abbreviated, sometimes with smooth brownish subterranean shoots, the crown thickened; stems sulcate, covered from base – as also petioles of radical leaves – with spreading or subappressed short setose hairs, in upper part with appressed hairs, branched proximally; radical leaves mostly large, long-petioled, usually rounded-reniform in outline, mostly with a flat noncordate base, trifid into broad-oblong-rhombic

471 or ovate-rhombic large acutely dentate segments, the large lateral lobes broader, the blade covered with short appressed setose hairs on both surfaces; lower cauline leaves petiolate, similar to the radical, upper leaves sessile, tripartite, with incised-dentate more or less oblong-rhombic segments; bracts ternately parted into linear-lanceolate segments; peduncles appressed-hairy, more or less sulcate, slender, elongated; flowers yellow, 2-2.4 cm in diameter; sepals divergent, hairy; petals obovate, cuneate, lustrous yellow above; receptacle glabrous, slender, cylindric; fruitlets somewhat irregularly obovoid-rounded, with a more or less sulcate border, with slightly convex sides, the beak triangularly broadened proximally, hamate-curved. June-July.

Forests and scrub, rarely meadows. — Far East: Uda, Uss., Sakh.

Gen. distr.: Jap.-Ch. Described from Japan. Type in Uppsala.

Note. In meadows beside the Amur River in the Blagoveshchensk area there occur aberrant plants with stems and petioles covered with spreading soft hairs, with the leaf blade deeply tripartite with widely distant oblong-cuneate segments, and with the rootstock almost obsolete. These may represent a separate species.

109. *R. stevenii* Andr. in Bess. Suppl. III ad catal. plant. hort. bot. Gymnas. Volhyn. cult. (1814) 19. — *R. acris* Jord. in Observat., plant. nov. VI (1847) 15 (non L.). — *R. acer* subsp. *frieseanus* Shmal'g., Fl. I, 22, ex pte. — Exs.: Fl. exs. austro-hung. No. 1720.

Perennial, tall, 40-60 cm high, with a thickened horizontally creeping rootstock covered with rufous coarse hairs, with cordlike fibers on lower surface, rarely rootstock obsolete; radical leaves long-petioled, orbicular, 3-5-partite almost to base, with broad oblong-rhombic cuneate, mostly deeply dentate-incised segments, the middle segment often trifid and dentate, the lateral segments deeply and unequally bifid and dentate, the whole blade more or less densely covered with setose appressed somewhat silky hairs, especially beneath, the petioles covered with appressed setose hairs, rufous at base of petiole and on sheaths; lower cauline leaves short-petioled, similar to the radical, the sheaths covered with appressed often rufous hairs; upper cauline leaves sessile, 3-4-partite, with oblong-lanceolate or linear entire or dentate segments; stems finely sulcate, distally branched, many-flowered, with appressed hairs (rufous at base of stem); flowers with long peduncles, often in corymbose inflorescence, 1.7-2 cm in diameter; sepals spreading, with long often rufous hairs, half the length of the petals, 472 subobtusate, with a scarious border; petals more or less rounded-obovate; receptacle glabrous; fruitlets 3.2-3.4 mm long, obovoid, smooth, flattened, slightly convex, the beak short, to 0.5 mm, straight, broadly triangular. May-July.

Forest and forest margins, rarely in meadows. — European part: M. Dnp., Bl., L. V. **Gen. distr.:** Centr. Eur. Described from the former Volyn Province. Type in Leningrad.

110. *R. baldshuanicus* Regl., ex Kom. in Trav. Soc. Nat. Pétersb. XXVI (1896) 67; O. A. and B. A. Fedch., Ranuncul. Turk., 55; Consp. Fl. Turk., 12; Raik. in Opred. rast. Tashk. II, 131. — Exs.: H. F. A. M. No. 139.

Perennial, with a sericeous or silvery pubescence, to 40-65 cm high; rootstock stout, torose-nodose, horizontal, short, with a stout lateral

excrecence covered with scales bearing appressed rigid hairs and with cylindrically broadened root fibers; stems many-flowered, distally branched except in lower part, covered with appressed silky silvery rigidulous hairs, bearing leaves throughout that gradually diminish upward and resemble petioles in shape; leaves pentagonal in outline, tripartite, their segments triangular-ovate or rhombic-ovate, deeply trisected into acute lanceolate or elongate-rhombic lobes, the lanceolate lobes somewhat dentate-incised, acute; lateral segments sessile, middle segment petiolate, the petiole bearing scattered rigid appressed or semiappressed hairs, the blade golden green, especially beneath more or less covered with short silky white hairs; cauline leaves with more dense silvery hairs especially beneath, similar to the radical leaves but smaller, with sessile middle segment; uppermost leaflets tripartite, with entire lobate segments, sessile, with hairy sheaths; peduncles slender, rounded, not sulcate, densely appressed-hairy; flowers 1.4–2 cm in diameter, their buds densely covered with long golden hairs; sepals spreading-recurved, densely covered with long somewhat yellowish white hairs; petals obovate, cuneate; fruitlets ovoid, laterally flattened, narrow-bordered, the beak short, triangular, straight, acuminate; receptacle short, narrowly cylindric, clavately broadened at apex, glabrous or with a tuft of short straight ciliate hairs confined to the very apex. May–June.

River valleys, irrigation ditches, and villages in foothills and the middle mountain zone, to 2,600–2,700 m. — Centr. Asia: Syr. D., Pam.-Al., T. Sh. Endemic. Described from Tadzhikistan. Type in Leningrad.

111. *R. laetus* Wall., Cat. Ind. pl. (1828) No. 4702 (nomen); Hook., Fl. br. Ind. I (1875) 19. — *R. acer* B. Fedtsch., Conspect. Fl. Turk I (1906) 12 (non L.).

- 473 Perennial, with rootstock thickened, horizontal, rigid, rarely abbreviated, covered with coarse scales and short setose hairs, 50–70(90) cm high, branched from the middle or above, with upright long slender appressed-hairy peduncles, the lower cauline leaves sharply set off from the upper ones; stems covered with appressed setose hairs bearing leaves mainly at base, leafless from base to lower branches; radical leaves broad-ovate, tripartite to base or almost to base or trisected and then the segments petiolate, deeply and unequally tripartite, with acutely lobate-incised or coarsely dentate-incised lobes, else the lateral segments bifid with coarsely and acutely dentate-incised lobes, all segments cuneate, light green and glabrate or with scattered short setose hairs above, whitish green and more densely hairy with very prominent veins beneath; cauline leaves and upper leaves, subtending the branches, the peduncles sessile (rarely with isolated petiolate leaves), tripartite, with unequal lanceolate or linear cuneate coarsely dentate-incised lobes, lobes of upper leaves entire; flowers bright yellow, 2.5–3 cm in diameter; sepals retrorse, appressed-hairy; receptacle glabrous; fruitlets 3 mm long, obovoid, bordered, laterally flattened with an attenuate base, the beak short, to 0.5 mm flat, laterally displaced, proximally broadened, straight, distally somewhat curved. June–July.

Riverbanks, sometimes in "tugai," damp places and irrigation ditches. — Pam.-Al., T. Sh. (W.). Gen. distr.: Ind.-Him. Described from India. Type in London (?).

112. **R. schaftoanus** (Aitch. et Hemsl.) Boiss., Fl. Or. Suppl. (1888) 5. — *Oxygraphis schaftoanus* Aitch. et Hemsl. in Journr. Linn. Soc. XIX (1882) 149. — Ic.: Aitch. et Hemsl., l. c., tab. 3.

474 Perennial, 15–25 cm high, with ascending glabrous weak simple stems; rootstock elongated, horizontally creeping or else poorly developed, with a basal row of long cylindric root fibers; leaves mostly only radical, glabrous, usually with very long weak petioles passing into a short whitish scarious sheath, the blade rounded-ovate in outline, somewhat fleshy, divided to base into 3 distant obovate-cuneate entire or obtusely 3–5-dentate-incised segments; cauline leaves mostly obsolete, sometimes a short-petioled leaf present at base, similar to the radical leaves; stems weak, 1-flowered, with small sessile bracteoles, bracteoles entire, linear or 2–3-partite with short-lanceolate lobes; peduncles glabrous; flowers large, yellow; petals 5, obovate, golden yellow or greenish yellow, twice as long as the sepals, some more or less persistent after flowering; sepals glabrous, obtuse, oblong-rounded, with scarious border; fruiting head globose, with numerous tightly clustered fruitlets; fruitlets 4.2–4.8 mm long, 2.8–3.5 mm broad, rounded-obovoid, slender, laterally flattened, especially in ventral part scarious-winged, short, glabrous, with 2 veins — one distinct, one indistinct — along the dorsal edge, green or with a somewhat purple upper edge; receptacle clavately thickened, glabrous, beak, short, 0.1–0.3 mm, sometimes obscure, dorsally displaced, proximally broadened, flat, hamately curved. July.

Unfixed alpine stone fields at 3,900–4,300 m, where almost the entire plant is buried by gravel and stones, with only the leaf blades and flowers emerging. — Centr. Asia: Pam.-Al. (Peter the First, Darvas, and Shugnan ranges). **Gen. distr.:** Afghanistan (Sikaram Mountains). Described from Afghanistan. Type in London.

Note. This species must be related to *R. platyspermus*, which has almost identical fruitlets and similarly persistent sepals. It is distinguished from *R. platyspermus* by the absence of pubescence on stems and peduncles, by the tripartite leaf blade, and by the strongly or weakly developed creeping rootstock. Thus the present species combines characters of the subgenus *Chrysanthé* (creeping rootstock, shape of leaves).

Subgenus 5. **MICRANTHUS** Ovcz. — Flowers sessile or subsessile, small, to 2–3 mm in diameter, often crowded in groups of 2–3 in leaf axils and in bifurcations of the almost furcately branching stems, with small basal bracts embracing the flowers; sepals 5, colored, some occasionally concrescent; nectaries 3–5, abortive, yellowish or whitish-scarious, usually shorter than sepals, spatulate, narrowed into a claw; stamens 4–6(7); petals orbicular; fruitlets more or less flattened, laterally bordered, punctate-tuberculate, with an erect, acuminate or slightly hamate-tipped beak. Small annuals of damp and muddy localities; leaves mostly entire, rarely more or less incised, often almost decussate; 3–4 species, mainly in the Mediterranean area.

113. *R. lateriflorus* DC., Syst. I (1818) 251; Prodr. I, 43; Boiss., Fl. Or. I, 53; Shmal'g., Fl. I, 18; N. Busch in Fl. cauc. crit. III, 3, 136. — Ic.: Deless., lc. sel. I (1820) tab. 30. — Exs.: HFR No. 1752.

Annually, usually small, 5–10 cm high, glabrous, reaching 15–20 cm in fruit; stems erect, hollow, mostly pseudo-dichotomously branching distally; roots slender, fascicular, sometimes adventitious roots on lower nodes; all except upper leaves long-petioled, glabrous, oblong-elliptic [in outline], the
475 uppermost leaves oblong-lanceolate, entire or slightly dentate at upper margin, especially in upper part of stem — where lateral branches are abortive-approximate, apparently opposite; bracts 2 (one a true bract, the other a cauline leaflet), sessile, with scarious sheaths embracing the axillary flower, often opposite at base of one shoot; flowers small, to 2–3 mm long, sessile or subsessile in axils of branches, opposite and terminal, in upper part of stem often crowded in groups of 3–4, due to abortion of lateral branches; perianth 5-lobed, occasionally 2 of the lobes concrescent, 2–2.5 mm long, petaloid; nectaries 3, rarely 5, spatulate, narrowed to a claw, mostly 1 mm long or even shorter, occasionally to 2 mm, scarious or slightly colored; stamens 4–7; anthers rounded; fruitlets rounded-elliptic, flat, with greenish borders, slightly tuberculate laterally (mainly close to the edges), the beak long, strong, acuminate, straight or somewhat hamate-tipped. April–June.

Banks of freshwater lakelets and of boggy depressions, muddy riverbanks, and argillaceous solonchic steppes. — European part: Crim., L. V., M. Dnp.; Caucasus: S. Transc.; W. Siberia: Irt.: Centr. Asia: Dzu.-Tarb. Gen. distr.: Bal.-As. Min. Described from the East. Type in Geneva.

Subgenus 6. **PACHYLOMA** (Spach) Ovcz. — Gen. *Pachyloma* Spach, Hist. Veg. VII (1839) 194. — Sect. *Echinella* DC., Prodr. I (1824) 41; Ldb., Fl. Ross. I, 45. — Gen. *Pfundia* Opiz. Seznam rost. (1852) 73 (nomen). — Sect. *Buthyranthus* subsect. *eubuthyranthus* Prantl in Engl. Bot. Jahrb. IX (1888) 267, 268; Ej. in Natürl. Pflzfam. III, 2, c. 65. — Characters in the key.

1. Radical and cauline leaves petiolate, entire, rounded-reniform, lobate-dentate-incised, cordate. Plant covered with silky white hairs; flowers small, 5–7 mm in diameter; peduncles short, thickened, recurved in fruit 114. *R. chius* DC.
- + Radical and cauline leaves petiolate, deeply tripartite or compound, segments petiolate, cordate or cuneate; flowers larger 2.
2. Leaves entire, broad-reniform, tripartite, with broad oblong-rhombic incised-dentate segments, slightly cordate or cuneate; fruitlets laterally covered with elongated acute prickles, with a tuberculate smooth border 115. *R. muricatus* L.
- + Leaves — at least the cauline — compound, once or twice tripartite, with narrow oblong or lanceolate lobes, sometimes the lowermost leaves entire and then oblong-cuneate. 3.
- 176 3. Radical leaves cuneate, entire, narrowly obtuse-oblong, soon drying; other leaves deeply divided, with mostly nonpetiolate lanceolate or linear-oblong lobes; fruitlets 4–6 in a head, with a thickened wide border covered with excrescences 118. *R. arvensis* L.

- + Radical leaves ovate-rounded in outline, deeply tripartite, with broadly obtuse or irregularly rhombic sessile segments rarely narrowed to a wide petiolate base; cauline leaves twice deeply tripartite, with narrow dentate segments; fruitlets with a sulcate border and laterally covered with punctate tubercles 116. *R. trachycarpus* Fisch. et Mey.
- ++ Radical leaves rounded-reniform in outline, tripartite, soon wilting; other leaves twice tripartite, with sessile segments deeply divided into dentate lobes; flowers large, to 1.5–2 cm in diameter; fruitlets laterally punctate-tuberculate or smooth, with a wide smooth non-sulcate border 117. *R. lomatocarpus* Fisch. et Mey.

114. *R. chius* DC., Syst. I (1818) 299; Prodr. I, 42; Boiss., Fl. Or. I, 54; Ldb., Fl. Ross. I, 47; Shmal'g., Fl. I, 18; Busch in Fl. cauc. crit. III, 3, 141. — Ic.: Guss., Enum. pl. Inar. (1854) tab. I, f. 1. — Exs.: HFR. No. 1751; Fl. cauc. exs. No. 158.

Annual, 6–20 cm high, rarely higher, covered with soft hairs; stem erect, somewhat nutant distally; leaves reniform-rounded [in outline], more or less broadly lobate-dentate-incised, all except uppermost entire, elliptic; bracts petiolate; peduncles lateral and terminal, arising from leaf axils, clavately thickened in fruit, recurved, 3–4 times as long as fruiting heads; flowers 5–8 mm in diameter; sepals hairy, about as long as petals; petals narrow-obovate or narrow-oblong, strongly narrowed proximally; stamens 6–8, with thickened filaments; fruitlets 4–4.5 mm long, ovate, laterally flattened, covered with tubercles bearing isolated hamately recurved acicular hairs, and with a narrow thin border, the beak broad proximally, somewhat curved from base, hamate-tipped, half as long as the fruitlet; receptacle very short, glabrous. April–May. (Plate XXX, Figure 2).

Scrub and forests, forest meadows, gardens, and fields. — European part: Crim.; Caucasus: W., S., and E. Transc. **Gen. distr.:** Med., Bal.-As. Min. Described from Greece. Type in Paris.

115. *R. muricatus* L., Sp. pl. (1753) 780; Ldb., Fl. Ross. I, 47; Shmal'g., Fl. I, 18; N. Busch in Fl. cauc. crit. III, 3, 140. — Exs.: Fl. cauc. exsic. No. 179; H. F. A. M. No. 145. — Ic.: Lam., Encycl. Illustr. tab. 498; Sibth., Fl. graeca, tab. 522; Rchb., Ic. Fl. Germ., f. 4615.

177 Annual, with fiberlike-cordlike fascicular roots, mostly to 10–30 cm high, more or less glabrous or else leaves, petioles, and peduncles covered with long ciliate, somewhat drooping, hairs; radical leaves long-petioled, sub-orbicular or rounded-reniform [in outline], trisected, rarely tripartite with petiolate segments or 2–3-partite and lobate-dentate; lower cauline leaves similar to the radical, upper leaves mostly lobate-tripartite, cuneate, rarely subentire, more or less sessile or short-petioled, uppermost leaves sometimes pseudo-opposite; peduncles more or less numerous, opposite, more or less sulcate, slender, alternate, tortuous; flowers 10–13 mm in diameter; sepals recurved, with scattered long ciliate hairs; petals obovate-oblong, 5–8 mm long, narrowed proximally, somewhat longer than sepals; receptacle covered with slender ciliate sparse hairs; stamens numerous; fruitlets 7–8 mm long, stellately spreading, flat, ovoid, with narrow bisulcate

border and along the edges, with numerous straight or distally curved, prickly excrescences, the beak broadened proximally, ensiform, straight or somewhat curved, terminal, half the length of the fruitlet. April–May. (Plate XXX, Figure 1).

Damp habitats, river valleys, irrigation ditches, and sometimes as a weed at roadsides and in fields. — European part: Crim.; Caucasus: W., S., and E. Transc., Tal.; Centr. Asia: Mtn. Turkm., Amu D., Syr D., Pam.-Al. **Gen. distr.:** Atl. Eur., Med., Bal.-As. Min., Arm.-Kurd., Iran, Ind.-Him. Introduced in North America and Australia. Described from the Mediterranean area. Type in London.

Note. In Abkhazia there occurs a plant which should perhaps be separated as a distinct variety. Ruprecht has labeled it *R. abchasicus* Rupr. (non Freyn); it is distinguished from the type by radical leaves, tripartite almost to base, by the petiolate middle segment, by more rigid pubescence, by smaller fruitlets, etc. A detailed study of the copious material is required.

116. *R. trachycarpus* Fisch. et Mey., Ind. sem. Horti Petrop. III (1836) 46; Ldb., Fl. Toss. I, 46; N. Busch in Fl. cauc. crit. III, 3, p. 139. — *R. lomatacarpus* var. *trachycarpus* Trautv. in A. H. P. VII, 2 (1881) 403. — *R. lomatacarpus* C. Koch in Linnaea XV (1841) 249, non Fisch. et Mey. — Exs.: Fl. cauc. exs. No. 87.

Perennial, 16–30 cm high; stems erect, glabrous or with scattered more or less spreading ciliate hairs appressed in distal part; radical leaves more or less long-petioled, orbicular or subreniform-rounded in outline, with broad rounded teeth, trilobate or tripartite, the middle segment sometimes broad-petioled, other segments more or less deeply trifid and rounded-dentate; lower cauline leaves petiolate, similar to the radical, upper leaves sessile, tripartite, with lanceolate oblong lobes, all cauline leaves with
478 ciliate sheaths; flowers 0.8–1.8 cm in diameter; petals obovate-elliptic, to 8 mm long, somewhat longer than sepals; fruitlets 3–5 mm long, more or less broadly rounded-obovoid, laterally flattened, with a narrow greenish bisulcate border, laterally punctate and covered with tubercles, rarely smooth, the beak lanceolate, one-third the length of the ripe ovary, more or less straight, acuminate, with unilateral decurrent border continuous with border of the fruitlet, sometimes curved distally; fruiting head loose, globose; receptacle ciliate-hairy. April–May. (Plate XXX, Figure 3).

Damp and boggy habitats. — European part: Crim.; Caucasus: Dag., W., S., and E. Transc., Tal. **Gen. distr.:** Med., Bal.-As. Min., Arm.-Kurd., Iran. Described from Transcaucasia (Georgia). Type in Leningrad.

117. *R. lomatacarpus* Fisch. et Mey. in Ind. Sem. Hort. Petrop. I (1835) 36; Ldb., Fl. Ross. I, 46; N. Busch in Fl. cauc. crit. III, 3, 140. — *R. tuberculatus* C. A. M., Verz. Pflz. Cauc. (1831) 202 (non Kit. nec DC.).

Annual, 20–40 cm high, with scattered more or less spreading hairs or glabrate; radical leaves long-petioled, initially undivided, with large rounded teeth, subsequently becoming tripartite or biternately divided, ovate in outline, the segments petiolate, rarely sessile, the middle segment with longer petiole, unequally tripartite almost to base, with 3–5-lobulate-dentate lobes or else incised-dentate, the lateral segments sometimes petiolate,

unequally tripartite or dissected into lobate-dentate lobes; cauline leaves petiolate, uppermost leaves sessile, tripartite or trisected into cuneate segments, sometimes deeply dissected almost to base, their lobes lanceolate-oblong or trisected and incised-lobate; flowers 1.5–2 cm in diameter; sepals recurved, slightly hairy, 5–7 mm long; petals obovate, rounded, 7–11 mm long; fruiting head rounded-oval, loose, with 13–15 fruitlets; fruitlets 4–6 mm long flattened, rounded-obovoid, with broad winglike border and smooth nonsulcate border, laterally tuberculate-villous or glabrate (var. *lejocarpus* Boiss.), the beak straight or slightly curved, 1–1.2 mm long, broad proximally, acuminate, lanceolate. April–May. (Plate XXX, Figure 4).

Damp places. — Caucasus: S. Transc.? E. Transc., Tal. **Gen. distr.:** E. Med., Bal.-Az. Min., Arm. LKurd., Iran. Described from the Caucasus. Type in Leningrad.

118. *R. arvensis* L., Sp. pl. (1753) 555; Ldb., Fl. Ross. I, 46; N. Busch in Fl. cauc. crit. III, 3, 136. — Ic.: Rchb., Ic. Fl. Germ. f. 4614. — Exs.: Fl. cauc. exs. No. 260; Hayek, Fl. stiriacae exs. (1905) No. 216.

479 Annual; roots slender, fascicular; stems erect, repeatedly more or less furcately branched, the fruiting peduncles convergent, glabrous, 12–25(30) cm high; lower leaves petiolate, entire, obovate or oblong-obovate, cuneate, mostly tridentate or trifid; other leaves ternately divided into cuneate-lanceolate or lanceolate segments, more or less deeply tridentate or entire; peduncles slender, weak and curved, straight and erect in fruit with scattered appressed slender white hairs; flowers light yellow, 8–10(12) mm in diameter; sepals divergent, hairy, yellowish-greenish, somewhat shorter than petals; petals 4–6 mm long, oblong-obovate, with very prominent veins; fruitlets stellately divaricate, few (mostly 4–6), large, 5 mm long (excluding beak), 3.5 mm broad, obovoid, both sides flat, with long prickly excrescences along their border, rarely tuberculate (var. *tuberculatus* Somm. et Lev.), the beak 3–5 mm long, straight or somewhat curved, subulate-acuminate, compressed. May–June.

Dry slopes, sandy-argillaceous riverbanks, loess foothills, and sometimes as a weed in fields. — European part: M. Dnp., Bl., Crim.; Caucasus: all regions; Centr. Asia: Mtn. Turkm., Amu D., Syr. D., Pam.-Al. **Gen.: distr.:** Centr. and S. Eur., Med., Bal.-As. Min., Arm.-Kurd., Iran, Ind.-Him. Described from Europe. Type in London.

Subgenus 7. **RANUNCULASTRUM** (DC.) Spach, Hist. Veg. VII (1839) 217. — Sect. *Ranunculastrum* DC., Prodr. I (1824) 27. — Sect. *Butyranthus* Subsect. *Ranunculastrum* Prantl in Engl. Bot. Jahrb. IX (1888) 267, 268; ej. in Engl. u. Prantl, Pflzfm. III, 2, 65. — Characters in the key.

1. Sepals reflexed; fruitlets firmly adhering to receptacle, with a small basal, proximally attenuate, free appendage not winged 2.
- + Sepals spreading or divergent; mature fruitlets readily deciduous, without basal appendages, mostly winged 6.
2. Fruitlets firmly concrescent with receptacle, the beak apical, long, corniformly curved, retrorse, 2.5 times as long as the ripe ovary *120. *R. orientalis* L.

- + Fruitlets less firmly concrescent with receptacle, the beak straight, upright or hamate-tipped, as long as or shorter than the ripe ovary 3.
3. Radical leaves ovate, tripartite to the middle or somewhat beyond, with broad rhombic obtusely lobate-incised and rounded-dentate segments 119. *R. oxyspermus* M. B.
- + Radical leaves compound, repeatedly divided or else entire, some leaves trisected into lanceolate lobes 4.
- 480 4. Plants densely silvery-lanate; leaves long, entire or trisected into linear-lanceolate lobes; flowers large, to 2–3.5(4) cm in diameter; fruitlets without tubercles, sometimes punctate . . . 124. *R. illyricus* L.
- + Plants 7–10 cm high; only lowermost leaves broadly trilobate or tripartite, other leaves pinnatisect; stems with spreading hairs; fruiting head oval 123. *R. ageri* Bert.
- ++ Plants larger; stems covered with appressed or drooping hairs; all leaves pinnately or repeatedly divided; fruiting head more or less cylindric or oval 5.
5. Stems covered with semiappressed erect hairs; segments of radical leaves divided into obovate cuneate obtusely dentate-incised lobes; fruitlets 4–4.3 mm long, with a wide rigid border, especially developed along the back 121. *R. cicutarius* Schlecht.
- + Stems covered with appressed, long drooping silky gray hairs; segments of radical leaves divided into 3 linear or narrow-lanceolate incised, sometimes entire lobes; fruitlets 3–3.5 mm long, with inconspicuous border 122. *R. pulsatillifolius* Litw.
6. Leaves simple, entire, dentate-incised, tripartite or 5-(rarely more)-palmatipartite 7.
- + Leaves compound (i.e., segments of first, sometimes also of second and third orders, petiolate), ternate or pinnatipartite 16.
7. Leaves tripartite to the middle or beyond, with broad more or less ovate or rhombic segments, else entire, dentate-incised or lobate . . . 8.
- + Leaves deeply 3–7-palmatipartite, with narrow linear or lanceolate lobes 15.
8. Leaves elliptic or oblong-elliptic in outline, more or less cuneate, entire or coarsely dentate or trilobate-incised at the apex. 10.
- + Leaves more or less orbicular [in outline], never longer than broad, tripartite or more or less entire 11.
9. Entire plant more or less densely covered with long silky hairs, 14–28 cm high; fruitlets narrow-bordered, hairy, to 4 mm long. 125. *R. paucidentatus* Schrenk.
- + Entire plant glabrous, sometimes stems slightly appressed-hairy; fruitlets more or less carinate, not bordered, glabrous, to 2 mm long 126. *R. alajensis* Ostenf.
11. Fruitlets (and pistils) glabrous or glabrate. Small glabrous or glabrate plants 12.
- 481 + Fruitlets hairy or setose. Rather large plants, 10–45 cm high, usually more or less hairy or hispid 14.
12. Fruitlets winged, flat, thin, glabrous or glabrate; petals obovate; roots thickened, short-oblong . . . 129. *R. mindshelkensis* B. Fedtsch.
- + Fruitlets laterally flattened, with an obscure border, glabrous or glabrate; petals oblong or obovate-oblong; roots elongated, cylindric 13.

13. Small plant, 5–10 cm high; petals narrow, oblong; flowers 1–1.7 cm in diameter; segments of ternately divided spreading small leaves, with 3 small teeth 128. *R. stenopetalus* Ovcz.
+ Plant 20–25 cm high; petals oblong-obovate; flowers 2–3 cm in diameter; leaves reniform-ovate [in outline], tripartite for two-thirds of their length, with broad approximate often dentate-incised segments 127. *R. aureopetalus* Kom.
14. Leaves cordate-reniform or orbicular in outline, more or less coriaceous, glabrous or more or less hairy, cordately notched; stems covered with drooping or spreading-setose hairs; beak of fruitlets straight, hamately curved distally 130. *R. afghanicus* Aitch. et Hemsl.
+ Leaves and petioles glabrous, leaves entire or somewhat incised-lobate or crenate, cuneate; stems glabrous from base; beak of fruitlets curved from base 131. *R. czimganicus* Ovcz.
15. Plant usually 10–20 cm high, with well developed simple or slightly branched stem bearing one to several flowers; fruitlets 2.5–3 mm long, laterally flattened; radical leaves 4–6-palmatipartite, with linear-oblong or elongate-lanceolate, mostly entire or slightly incised lobes 132. *R. pedatus* Waldst. et Kit.
+ Small high-mountain plant, 3–10 cm high, with aphyllous simple 1-flowered stems, mostly with numerous adventive plants growing from small tubers at base; leaves 5–6 or more times divided into linear lanceolate lobes; fruitlets to 1–1.2 mm long, more or less convex 133. *R. turkestanicus* Franch.
16. Radical leaves 1–2-pinnatipartite 17.
+ Radical leaves 1–3 times tripartite or else tripartite with pinnatisect parts 19.
17. Stems with spreading hairs; fruiting head cylindric or ovoid-cylindric; fruitlets winged, initially with isolated obscure hairs, subsequently glabrous, the beak about as long as the ripe ovary; leaves tripinnatisect 134. *R. komarovii* Freyn.
- 182 + Stems appressed-hairy; fruitlets uniformly short-pubescent or glabrous or with appressed ciliate hairs confined to the back; fruiting head oval-ellipsoid or cylindric 18.
18. Fruitlets to 2.5 mm long, uniformly pubescent; lobes of leaf segments shorter; fruiting head cylindric 137. *R. pinnatisectus* M. Pop.
+ Fruitlets glabrous, with scattered cilia confined to the edge – especially the dorsal edge – to 6 mm long; lobes of leaf segments longer, linear or linear-lanceolate; fruiting head more or less ovoid 136. *R. walteri* Rgl.
19. Beak of fruitlets obscure, 0.2–0.4 mm long, hamate from base; sepals, sometimes also petals, deformed, usually persistent in fruit 144. *R. platyspermus* Fisch.
+ Beak of fruitlets much longer, straight, curved only distally or from the middle; sepals and petals not persistent in fruit 20.
20. Segments of ternately divided radical leaves wide, rhombic, with incised-dentate margins; fruiting head cylindric or ovoid-cylindric 135. *R. dilatatus* Ovcz.

- + Segments of radical leaves narrow, lanceolate, cuneate or linear or repeatedly divided into linear lobes 21.
- 21. Sections of tripartite radical and cauline leaves petiolate, repeatedly pinnatisect, with linear-lanceolate lobules; cauline and radical leaves similar in shape; petals oblong-obovate, with a claw; fruitlets small, slightly convex, hairy, finely alveolate . . . 139. *R. tenuilobus* Rgl.
- + Leaves 1-3 times tripartite, rarely segments of first order entire or incised 22.
- 22. Radical leaves tripartite, with entire narrow-lanceolate or narrowly 2-3-partite more or less broadly cuneate segments, the lateral segments short-petioled or subsessile 23.
- + Radical leaves 2-3 times deeply tripartite, with narrower smaller lobes 25.
- 23. Stems appressed-hairy; leaf segments or their lobes narrow-linear; fruiting head oval, small 138. *R. linearilobus* Bge.
- + Stems with spreading hairs; leaf segments or their lobes lanceolate, wider; fruiting head oval-globose or oval-elongated 24.
- 483 24. Fruitlets glabrous; leaf segments elongate, oblong-lanceolate, entire or divided, often incised 140. *R. severzovii* Rgl.
- + Fruitlets with long hairs along the edges; leaves broad-ovate in outline, their segments lanceolate, mostly trilobate or tripartite, with entire or dentate-incised lobes 141. *R. leptorrhynchus* Aitch. et Hemsl.
- 25. Fruitlets (and pistils) hairy 26.
- + Fruitlets (and pistils) glabrous 28.
- 26. Segments of ternately divided leaves subsessile, cuneate-ovate in outline; thickened roots elliptic or elongate-elliptic 143. *R. elbrusensis* Boiss.
- + Segments of ternately divided leaves long-petioled, especially the middle segment deeply and compoundly divided 27.
- 27. Receptacle short-hairy; fruitlets to 5 mm long, with a long 2-2.5 mm beak; stems strongly branched, branches spreading **R. aucheri* Boiss.*
- + Receptacle glabrous; fruitlets to 3 mm long, beak short, 1-2 mm; stems slightly branched, with erect or obliquely ascending branches 142. *R. alpigenus* Kom.
- 28. Stems with spreading hairs; radical leaves tripartite, with ternately dissected segments; sepals recurved 145. *R. meinshauseni* Schrenk.
- + Stems with upright appressed hairs; radical leaves 2-3 times tripartite, with segments of the first and often of the second order petiolate; sepals diverging 146. *R. regelianus* Ovcz.

Section 1. *XIPHOCOMA* (Stev.) Ovcz.— *Xiphocoma* Stev. in Bull. Soc. Nat. Mosc. XXV (1852) 537, pro gen.— Fruitlets not flattened, thickish, with one dorsal vein at the apex, as if drawn out into a more or less elongated, strong hamate-tipped or corniformly curved beak, usually their edge strongly concrescent with the receptacle, with a free proximally attenuate, or more

* This species, described from southern Iran, does not occur in the USSR, where it is replaced by the closely related *R. alpigenus* Kom. and *R. elbrusensis* Boiss.

or less broad rounded dorsal basal appanadage not winged or slightly winged.

119. *R. oxyspermus* M.B. in Willd., Sp. pl. II (1799) 1328; Fl. taur.-cauc. II, 97; III, 384; Ldb., Fl. Ross, I, 29; Shmal'g., Fl. I, 19; Busch in Fl. cauc. crit. III, 3, 179. — *R. constantopolitanus* var. *palaestinus* O.Ktze. in A.H.P. X, 145, non Urv. — Ic.: Bertol., Miscell. II, tab. I, f. 2 (sub *R. mucronato*). Exs.: Herb. Fl. cauc. No. 121.

484 Perennial, 20–36 cm high, with rather profuse drooping spreading white hairs; roots tuberously thickened, elongated; stems profusely branched, many-flowered; radical leaves petiolate, ovate, cuneate or rounded, rarely subcordate, tripartite to the middle or somewhat beyond, with broad-rhombic lobate-incised and rounded-dentate segments; flowers 2–3 cm in diameter; sepals yellowish-greenish, recurved, hairy, 6–8 mm long; petals oblong-elliptic or obovate, 9–15 mm long; fruiting head compact, oblong; fruitlets 3–3.5 mm long, angular-ovoid, finely tuberculate laterally, often with scattered hairs; beak erect, straight, acuminate, somewhat shorter than the ripe ovary. April–June.

Steppes, dry meadows, river valleys, and sometimes as a weed in fields and at roadsides. — European Part: V.-Don, Transv., Bl., Crim., L. Don, L. V.; Caucasus: all regions, but in W. Transc. confined to NW part; Centr. Asia: Mtn. Turkm. **Gen. distr.:** Centr. Eur. (Dobruja), Bal.-As. Min., Arm.-Kurd., Iran. Described from the Crimea. Type in Leningrad.

*120. *R. orientalis* L., Sp. pl. (1753) 781; Boiss., Fl. Or. I, 27; N. Busch in Fl. cauc. crit. III, 3, 182. — *Xiphocoma orientalis* Stev. in Bull. Soc. Nat. Mosc. XXV (1852) 538. — *X. atropatana* Stev., l.c., 539. — Ic.: Stev., l.c., tab. VII, f. 1.

487 Perennial, 10–14 cm high, with solitary stems and a bundle of tuberously thickened cylindric roots; stems often almost furcately branched distally, with diverging straight peduncles, few-flowered, with appressed or semi-appressed erect hairs; radical leaves with more or less long appressed-hairy petioles, the blade more or less ovate, with appressed-ciliate hairs, compound, more or less bipinnatifid, the segments mostly petiolate, the upper segments very distant from the lower pair and less divided, almost pinnatifid or ternately divided into short-oblong or oblong-elliptic subentire or dentate-incised lobes; cauline leaves sessile or short-petioled, once or twice tripartite, with narrow linear or linear-lanceolate elongate lobes; fruiting peduncles more or less sulcate; flowers 1.7–1.8 cm in diameter; sepals 5, recurved, ovate, hairy beneath; petals 5, oblong or oblong-subovate, longer than sepals; receptacle glabrous, cylindric, anthers more or less flat, elongated, somewhat shorter than the filaments; fruiting head with fruitlets firmly adherent over entire length of their base, strong, corniform, 5–6 mm long, their base broadened and more or less irregularly triangular-rounded, laterally flattened with small tubercles at the sides and with a short free dorsal basal appendage, the beak corniformly curved, retrorse, hamately curved distally, 2.5 times as long as the ripe ovary. April–May.

This species has been collected in the parts of Turkish Armenia and Iran bordering on the USSR, and it is highly probable that it occurs in the



PLATE XXXI. 1 — *Ranunculus stenopetalus* Ovcz.; 2 — *R. mindshelkensis* B.Fedtsch.; 3 — *R. afghanicus* Aitch. et Hemsl.; 4 — *R. turkestanicus* Franch.; 5 — *R. alpigenus* Kom.; 6 — *R. elbrusensis* Boiss.

USSR as well. The reports of its occurrence on the eastern shore of the Caspian Sea is erroneous. **Gen. distr.:** Arm.-Kurd., Bal.-As. Min., Med. (N. Afr.), Iran. Described from Europe. Type in London.

Note. In the part of Iran adjacent to the USSR, near Urmia in Azerbaijan, there occurs a closely related species — *R. dasycarpus* Boiss. (Boiss., Fl. Or. I, 1867, 38; *Xiphocoma dasycarpa* Stev. in Bull. Soc. Nat. Mosc. 1852, II, 539, tab. VII, f. 3), distinguished by hairy fruitlets with a shorter and less curved beak and by narrower leaf lobes.

121. *R. cicutarius* Schlechtd., Animadv (1819) 25; N. Busch in Fl. cauc. crit. III, 3, 181. — *R. orientalis* C.A.M., Verz. Pflz. Cauc. 201; Ldb., Fl. Ross. I, 29 γ, non L. — *R. daucifolius* Stev. in Bull. Soc. Nat. Mosc. XXI (1848) 270; XXV (1852) 543. — Ic.: Schlechtd., l.c., tab. IV, f. 2; Stev., l.c., tab. VII, f. 8.

Perennial, 15–38(40) cm high; roots in the form of a bundle of tuberous oblong-ovoid thickenings; stems solitary, distally with profuse spreading branches, mostly many-flowered, densely covered with semiappressed grayish white silky hairs directed upward; radical leaves more or less long-petioled, the blade more or less oblong-ovate, pinnately compoundly divided into more or less petiolate pinnatifid, more often ternately divided segments with cuneate-obovate, obtusely dentate-incised lobes; upper cauline leaves — especially the lower ones — more or less petiolate or sessile, more deeply pinnately or ternately divided (the middle segment often long-petioled) into pinnatifid segments with oblong obtusely dentate-incised lobes; peduncles rounded, scarcely sulcate, thickening in fruit, straight, divaricately pointing upward; flowers 1.6–2.1 cm in diameter; sepals 5, oblong-elliptic, retrorse, with silky hairs; petals obovate, cuneate; receptacle glabrous; fruiting head oblong-oval, compact, with numerous fruitlets; fruitlets 4–4.3 mm long, rigid, firmly adhering to the receptacle for a very small part of their length, long-persistent, flattened, glabrous, punctate-alveolate laterally, more or less ovoid-triangular in outline, the beak ensiform, more or less triquetrous, as long as or very slightly shorter than the ripe ovary, sometimes with short basal cilia, straight or somewhat curved, proximally broadened with a slender hamate-curved tip. April–May.

Meadows. — Caucasus: Dag., E. Transc., Tal. **Gen. distr.:** Iran. Type in Berlin.

Note. The classical habitat of this species is unknown. Schlechtendal, its author, cited Dr. Merck's specimens, which are in Pallas' herbarium — included in Willdenow's Herbarium — collected in East Siberia; this is surely an error.

122. *R. pulsatillifolius* Litw. in Tr. Bot. Muz. Akad. Nauk I (1902) 25.

Perennial, 14–35(38) cm high, with soft appressed and drooping silky white hairs; roots in a compact bundle developed as thickened oblong "tubers"; stems solitary, erect, distally branched, with several to many flowers, peduncles erect, diverging in fruit; radical leaves long-petioled, initially grayish due to silky white hairs, subsequently greenish, the blade ovate or oblong-ovate in outline, compoundly pinnatifid, their segments opposite or alternate, deeply pinnately or palmately divided into 3–5 linear or narrow-lanceolate entire, more often incised acute lobes, the median

lobe mostly deeply palmately tripartite, with distant lobules; upper leaves sessile or subsessile, their segments deeply divided into longer linear lobes; peduncles slightly sulcate (conspicuously so in fruit), elongated, slender; flowers 12–14 mm in diameter; sepals 5, more or less ovate, sericeous, fimbriate, retrorse; petals 5, obovate or more or less oblong-obovate, cuneate; receptacle cylindric, glabrous; fruiting head ovoid-oblong or subcylindric; fruitlets (not quite ripe) 3–3.3 mm long, flattened, finely alveolate-punctate, glabrous, concrescent with receptacle for a very short part of their broadened base, long-persistent, the beak erect, straight or slightly curved, about as long as or shorter than the ripe ovary, sometimes with a somewhat hamate tip. April–May.

Foothills. — Centr. Asia: Mtn. Turkm. (Kopet Dagh). Endemic. Described from Turkmenia. Type in Leningrad.

123. *R. ageri* Bertol., Opusc. 3 (1819) 182; Boiss., Suppl., 6. — *R. gracilis* Ldb., Fl. Ross. I, 28, non DC. — *R. peloponnesiacus* Boiss., Diagn. Ser. 1, I (1842) 63. — *R. peloponnesiacus* var. *granulatus* Boiss., Fl. Or. I (1867) 29. — *R. ageri* Bertol. var. *granulata* N. Busch in Fl. cauc. crit. III, 3, 176; Grossg., Fl. Kavk. II, 113. — Ic.: Bertol. III (1819) tab. 6.

489 Perennial, 7–10 cm high; roots thickened, ovoid; stems low, 1 or 2-flowered, slender, somewhat ascending, proximally with long spreading hairs; leaves ovate, pinnatipartite into segments, these in turn deeply incised into obtusely dentate-lobulate lobes; sepals recurved, with scattered hairs; petals obovate, to 14 mm long, to 9 mm wide; anthers large, to 5 mm long; fruitlets crowded in a compact ovoid head, the terminal beak almost recurved, shorter than the ripe ovary. April.

Dry places. — Caucasus: E. and S. Transc. Gen. distr.: Bal.-As. Min., Med. Described from Italy.

Note. Boissier cites for the Caucasus not the typical *R. ageri* but a distinct variety, var. *granulatus* Boiss. with pinnatipartite leaves and smaller fruitlets and flowers. As we have only one specimen of this plant at our disposal, the question of the status of this form remains unanswered, as was earlier noted by N. A. Bush (l. c.).

124. *R. illyricus* L., Sp. pl. (1753) 752, 776; Ldb., Fl. Ross. I, 30; Boiss., Fl. Or. I, 29; Schmal'g., Fl. I, 19; N. Busch in Fl. cauc. crit. III, 3, 177. — Ic.: Jacquin, Fl. austr. III (1775) tab. 222; Rchb., Ic. Fl. Germ. f. 4587. — Exs.: Fl. exs. austro-hungar. No. 1712; Fl. Hung. exs. Mus. Budap. II, 110 No. 170.

Perennial, 18–45 cm high, tomentose sericeous, sometimes with subterranean shoots terminating in a bundle of tuberous roots; thickened roots ovoid-oblong; stem erect, simple or branched, few-flowered; leaves trisected into linear or lanceolate elongate entire or incised-partite lanceolate segments, with short lobes; the very first radical leaves entire, lanceolate or lance-ovate; upper cauline leaves sessile, dissected into entire linear-lanceolate segments; flowers 2–3.5 cm in diameter, rarely larger; sepals white-tomentose on the outside, recurved; petals broad-obovate, pale yellow, 12–17 mm long; fruitlets crowded in a compact oblong head, glabrous or slightly hairy, laterally flattened, irregularly rhombic-ovoid, punctate, the beak short, erect, straight, with somewhat hamate tip. April–June.

Chernozem and gravelly steppes, sandy soil on dry hills and herbaceous slopes, sometimes in fields, and occasionally in broadleaf groves and steppe oak forests. — European part: U. V. (introduced in the Moscow area), U. Dnp.?, M. Dnp., V.-Don, Transv., Bl., Crim., L. Don, L. V.; Caucasus: Cisc., Dag., W. Transc. (Novorossiisk area), E. and S. Transc., Tal. **Gen. distr.:** Centr. Eur., Med., Bal.-As. Min., Arm.-Kurd. Described from Europe. Type in London.

90 Section 2. **PTEROCARPA** Ovcz. — Fruitlets mostly quite flat, mostly broad-winged or else with more or less developed border, slightly concrescent with receptacle, readily deciduous when mature. Most species with creeping short shoots.

125. **R. paucidentatus** Schrenk in Bull. phys.-math. Acad. Petersb. III (1845) 309; Trautv. in Bull. Soc. Nat. Mosc. XXXIII, I, 67; Kom. in Tr. SPb. Obshch. Estestv. XXVI, 66; O. and B. Fedch., Ranunc., Turk., str. 47. — Exs. — H. F. A. M. No. 146.

Perennial, 14–28 cm high; roots thickened-fusiform; stems branched distally with remote upright branches rarely simple, covered with slender spreading silky white hairs; radical leaves elongate-oblong or oblong-elliptic [in outline], mostly tridentate at the apex, the short broad petiole passing into a scarious whitish sheath, densely sericeous, with the exception of the slightly pubescent upper surface; cauline leaves oblong-lanceolate or linear-lanceolate, entire, apically 2–3-toothed, hairy, sessile, somewhat amplexicaul; peduncles elongated, erect or declinate, more or less sulcate, hairy, the hairs with a torulose basal swelling; flowers 13–14(25) mm in diameter, yellowish-greenish; sepals more or less appressed, more or less narrow-ovate, hairy, with whitish scarious border, shorter than petals; petals obovate-elliptic; receptacle glabrous; fruitlets numerous, in an oblong-ellipsoid head, to 4 mm long, flattened, orbicular, with a winged border, the beak broadened proximally, straight with a hamately curved tip. May–June.

Herbaceous steppe slopes, forest and subalpine zone, to 1,800–3,000 m. — W. Siberia: Irt. (mountainous SW part); Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. Endemic. Described from the Aktau Mountains. Type in Leningrad.

126. **R. alajensis** Ostenf. in Vidensk. Medd. f. naturh. Foren. Kbhvn. 7 (1901) 314. — **R. flexicaulis** Kom. in Tr. SPb. Obshch. Estestv. XXVI (1896) 55, non Rouy et Foucaud (1893). — **Oxygraphis glacialis** var. **pentapetalus** Rgl. in herb. — Ic.: Ostenf., l. c., p. 315, f. 1.

Perennial, small, 3–10 cm high; thickened roots elongated, cylindric; stems solitary or 2–5, weak, slender, ascending, simple, rarely 1 or 2-branched, glabrous or slightly appressed-hairy distally, 1–3-flowered, with 1 or 2 leaves; radical leaves numerous, short-petioled, glabrous, somewhat fleshy, broadened into a long scarious-bordered sheath, the blade elliptic or oblong-elliptic and apically broadened or almost ovate-elliptic, cuneate, entire or apically coarsely tridentate or trilobate-incised, the middle lobe mostly longer and entire, the lateral lobes entire or slightly dentate, rarely the blade trifid almost to the middle (var. **pamiricus**

491 Ovcz.); cauline leaves sessile or short-petioled, ovate or lanceolate, entire or incised or tridentate; peduncles glabrous, rarely with scattered short pubescence; flowers single, golden yellow, 1.8–2.4 cm in diameter; sepals 5, yellowish green, oblong-ovate or oblong, glabrous; petals 5–10, oblong- or oblong-obovate, sometimes more or less emarginate, shiny yellow, often turning green when dry, 1.5–2.5 times as long as sepals, tapering proximally; receptacle glabrous; fruiting head subglobose; fruitlets flattened oblong-obovoid, 1.7–2 mm long, the beak dorsal, to 0.7 mm long, slender, inclined to the side, its hamate tip often turning black. June–July.

Damp alpine meadows, banks of rivulets, and beside springs in the alpine zone, at 2,700–4,100 m. — Centr. Asia: Pam.-Al., T. Sh. Endemic. Described from the Alai Range. Type in Copenhagen.

Note. Pamir-Shugnan plants are distinguished by the great variability of their leaves and by the less rounded blades; further collections and observations may perhaps lead to their recognition as a distinct species.

127. *R. aureopetalus* Kom. in Tr. SPb. Obshch. Estestv. XXVI (1896) 55; O. A. and B. A. Fedch., Consp. fl. Turk. 1, 8.

Perennial, 10–25 cm high; thickened roots elongate-cylindric; stems solitary or numerous, glabrous, simple, with one to many flowers; radical leaves cordate-reniform [in outline], long-petioled, glabrous, 3–5-partite for two-thirds of their length, with broad-obovate coarsely incised-dentate lobes; cauline leaves sessile, almost amplexicaul, 3–5-palmatipartite, with oblong-obovate, more often linear-lanceolate entire or (in lower leaves) dentate-incised lobes; peduncles one or several, with semiappressed or somewhat spreading slender white hairs; flowers often in corymbose inflorescence or single, golden, to 2–3 cm in diameter; sepals brownish, glabrous, 9–10 mm long; fruiting head oblong-ovoid, to 12–18 mm long; receptacle glabrous, oblong-ellipsoid; fruitlets 2.5–3 mm long, obovoid, laterally flattened, with a delicate narrow scarious border, the beak short, to 0.3 mm hamately involute, turning black. June.

Meadows and scrub in the subalpine zone of mountains. — Centr. Asia: Pam.-Al. Endemic. Described from the Kumar Gorge, in the basin of the mountain part of the Zeravshan River. Type in Leningrad.

128. *R. stenopetalus* Ovcz., sp. nova in Addenda VI, p. 575.

492 Perennial, small, to 5–8 cm high, forming small mats, with 1 or 2 simple, rarely slightly branched 1–3-flowered stems; roots in a small compact bundle, thickened, oblong-cylindric, often nodose, entangled with slender root fibers; stems slender, weak, glabrous from base or covered with spreading tangled short hairs, aphyllous or with 1 or 2 small sessile leaflets at base of peduncles; radical leaves slender-petioled, glabrous, the blade 6–9 mm long, 10–13 mm wide, tripartite for three-fourths or four-fifths of its length or almost to base, with more or less obovate cuneate segments, the middle segment narrower than the lateral, trilobate-incised or trilobate-dentate, the lateral segments remote, unequally trilobate-incised, the lobes short, orbicular, sometimes with 1–2 small obtuse teeth at the apex; cauline leaves sessile, 2–3-partite almost to base, with lobate or linear entire lobes or the uppermost leaves quite entire; peduncles covered with short down; flowers 1–1.7 cm in diameter, golden yellow,

with 5-6 lobes; sepals yellowish-greenish, ovate, fimbriate, glabrous, 5-7 mm long, more or less acuminate; petals oblong, tapering proximally or narrow-oblong, 0.8-1.1 cm long, mostly directed somewhat upward; receptacle glabrous; fruitlets (immature) flattened, smooth, glabrous, with obscure narrow almost scarious border, 2-2.3 mm long, mostly obovoid, the beak short, to 0.5-0.6 mm with hamate tip. June. (Plate XXXI, Figure 1).

Alpine grass plots near thawing snow.— Centr. Asia: Pam.-Al. Endemic. Described from the Fergana Range (Peshkaut Pass). Type in Leningrad.

129. *R. mindshelkensis* B. Fedtsch., Rast. Turk. (1915) 416; Popov in Sched. Herb. Fl. As. Med. VI (1925) 10.— Exs.: H. F. A. M. No. 144.

Perennial, glabrous, 5-6 cm, rarely to 15-25 cm high (in subalpine zone); roots in a compact bundle, thickened, short-oblong, cylindric, 1.5-3 cm long, slender, long, fiberlike; radical leaves more or less coriaceous, glabrous, with more or less long petioles, with a short whitish sheath, the leaf blade broadly rounded, reniform-rounded in outline, cordate, deeply tripartite, with incised and incised-dentate segments; cauline leaves mostly simple, tripartite with broad-linear long entire, rarely apically 5-toothed lobes, the uppermost leaves entire, once or twice divided; stem low, 4-8 cm high, ascending, usually 3- or 1-flowered, glabrous, rarely with obscure scattered hairs, usually shorter than peduncles; flowers 10-15 mm in diameter; sepals more or less divergent, ovate, 5-6 mm long, glabrous, yellowish green or brownish green, with whitish or dark brown-lilac margin, two-thirds the length of the petals; petals golden, oblong-obovate, 8-10 mm long; fruiting head ovoid; receptacle narrowly cylindric, slender, glabrous; fruitlets strongly flattened, glabrous or glabrate, the beak short, 3-4 mm, with hamate-curved tip. (Plate XXXI, Figure 2).

Argillaceous and gravelly slopes in the subalpine and alpine zones.— Centr. Asia: T. Sh., Pam.-Al. (Mt. Kugitang). Endemic. Described from the Kara-Tau Range. Type in Leningrad.

130. *R. afghanicus* Aitch. et Hemsley in Journ. Linn. Soc. XIX (1882) 148.— *R. divergens* Aitch. in Journ. Linn. Soc. XVIII (1881) 30, non Jord.— *R. olgae* Rgl. in Izv. Obshch. lyubit. estestv., antrop. i etnogr. XXXIV, f. 2 (1882) 1.

Perennial, 10-30 cm high; roots in a bundle of numerous slender thickened cylindric fusiform fibers; stems simple or 1-3-branched in upper part, 1- or 2-flowered, covered with numerous more or less drooping hairs, rarely glabrate (f. *glabrescens* Ovcz.); radical leaves cordate-reniform or orbicular in outline, long-petioled, glabrous or with more or less sparsely hairy ciliate margins, 3-5-partite for one-third or half of their length, their lobes irregularly obovate, distally broadened, coarsely dentate at the upper margin, sometimes lobulate, coriaceous, often callously thickened at the margin, the petioles hairy or glabrous (f. *glabrescens* Ovcz.); cauline leaves tripartite, with oblong-linear entire, somewhat ciliate-margined lobes; flowers 20-26 mm in diameter; sepals 5, elliptic, with drooping hairs, half as long as petals, striate, obtuse, divergent; petals 5, rounded-obovate, golden or yellow; fruiting head ovoid; fruitlets rounded-elliptic or orbicular, 3.5-4 mm long, hairy, flattened, slightly bordered

laterally with obscure transverse veins, the straight beak proximally broadened, hamately involute distally, with tip often turning blackish. May-July. (Plate XXXI, Figure 3).

Steppe slopes, patches of thawing snow in the subalpine and alpine zones at 1,800-3,000 m. — Centr. Asia: Mtn. Turkm., Pam. Al., T. Sh. **Gen. distr.:** Afghanistan. Described from Afghanistan. Type in London.

131. *R. czimanganicus* Ovcz., sp. nova in Addenda VI, p. 576.

Perennial, to 40-45 cm high; stems branched, many-flowered, with scattered semiappressed hairs or glabrous from base; radical leaves more or less coriaceous, glabrous, reniform-rounded, [in outline] cuneate, broadly lobate-incised, crenate-dentate; cauline leaves sessile, tripartite to base, with entire or incised oblong-lanceolate lobes; peduncles sulcate; fruitlets in a compact globose head, with scattered hairs, the beak long, recurved from base, distally hamate and acute. April-May.

494 Centr. Asia: Western Tien Shan. Endemic. Described from Chimgan. Type in Leningrad.

132. *R. pedatus* Waldst. et Kit., Descr. et icon. pl. rar. Hung. II (1805) 112; Ldb., Fl. Ross. I, 29; Schmal'g., Fl. I, 12; Kryl., Fl. Zap. Sib. V, 1183. — Ic.: W. et K., l.c., tab. 108. — Exs.: Fl. cauc. exs. No. 307; Fl. Hungar. exsic. No. 662.

Perennial, (6)12-25(32) cm high, with thickened tuberous oblong or oblong-cylindric roots; stems simple or slightly branched, with one to several flowers, covered with scattered appressed slender hairs or glabrate; radical leaves long-petioled, glabrous or slightly pubescent, the lowermost leaves trilobate, all other leaves palmately 3-5-partite, with linear-oblong or linear entire, rarely very slightly dentate lobes; cauline leaves small, entire or tripartite with entire lobes; flowers 15-25 mm in diameter; sepals more or less ovate, slightly hairy or glabrate, divergent, yellowish-greenish, 4-6 mm long; petals usually 5, obovate, 8-12 mm long; receptacle glabrous, oblong; fruitlets tightly clustered in an oval head, 2.5-3 mm long, flattened, more or less ovoid-rounded, slender, glabrous, narrow-bordered, the beak short, straight, with a curved tip.

Dry herbaceous slopes in the north, steppes and steppe depressions, rarely in meadows and among shrubs, mainly in the steppe and forest-steppe zone. — European part: M. Dnp., V.-Don, Transv., Bl., Crim., L. Don, L. V., Urals?; Caucasus: Cisc.; W. Siberia: U. Tob., Irt., Alt.; Centr. Asia: Balkh. (E.), Dzu.-Tarb., T. Sh. **Gen. distr.:** Centr. Eur., Bal. (N.). Described from Hungary. Type in Budapest.

133. *R. turkestanicus* Franch. in Ann. Sc. Natur. XV (1883) 217; Kom. in Tr. SPb. Obshch. Estestv. XXVI, 53; Fedtch., Conspect. Fl. Turk. I, 8. — Ic.: Franch., l.c., tab. 11.

Perennial, 3-10 cm high, mostly with one, rarely with 2 erect aphyllous glabrous or hairy (var. *lanuginosus* Franch.) stems, with numerous adventitious shoots arising from basal tubercles; roots in a more or less compact bundle of long cordlike and short, tuberously thickened fibrous roots, entangled with slender fibers; radical leaves small, petiolate, glabrous, mostly rounded-ovate in outline, divided 5-6 or more times into

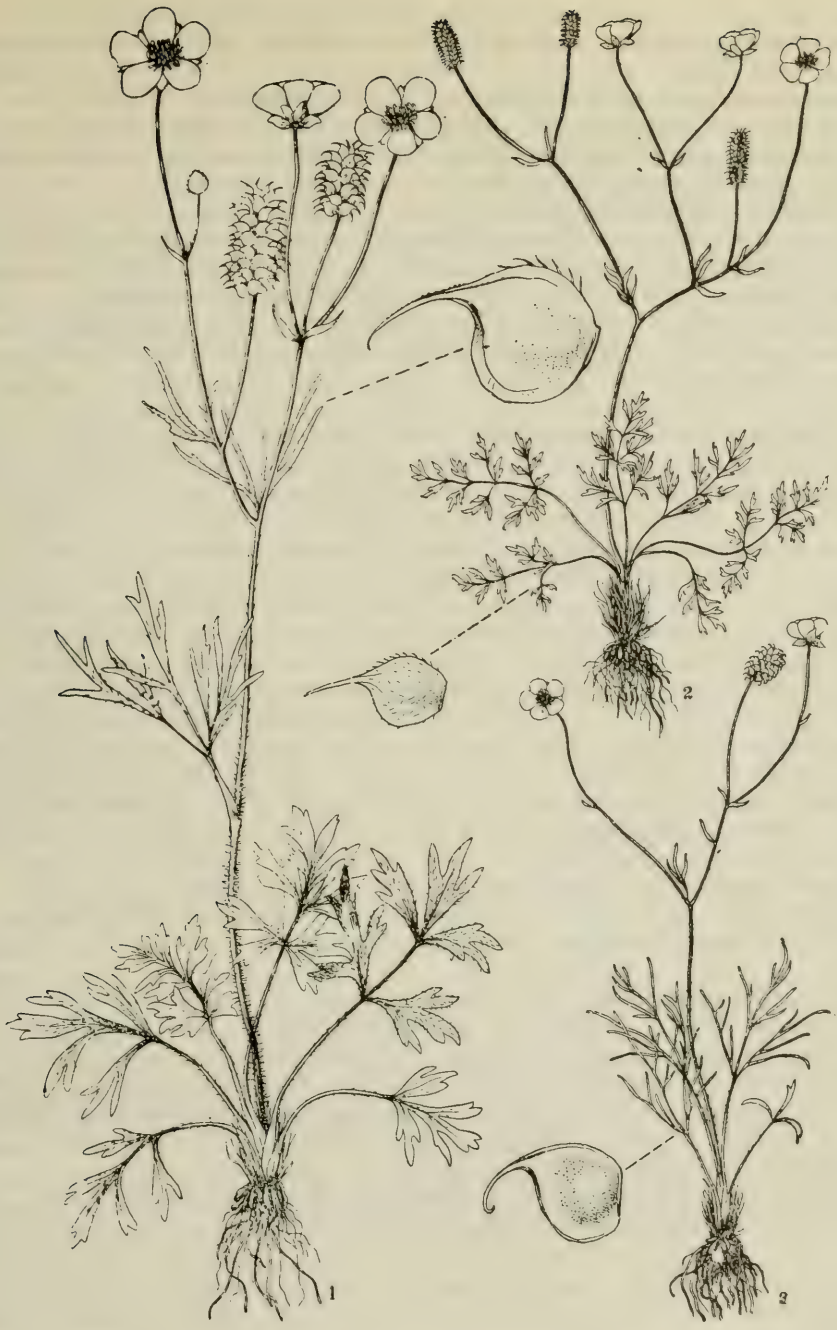


PLATE XXXII. *Ranunculus leptorhynchus* Aitch. et Hemsl.; 2 - *R. pinnatisectus* M.Pop.;
3 - *R. linearilobus* Bge.

497 linear or lanceolate subacute apically entire or coarsely incised lobes; sepals semiappressed or recurved, glabrous, elliptic, acuminate, 4–5 mm long, greenish; petals obovate or oblong-obovate, 8–12 mm long; receptacle oblong-cylindric, acuminate, glabrous; fruiting head ovoid-ellipsoid or oblong-ellipsoid, compact, with numerous fruitlets; fruitlets small (1–1.2 mm long), oblong-elliptic, slightly convex, greenish, glabrous, the short blackish beak displaced toward the back, hamately curved from base. June–August. (Plate XXI, Figure 4).

Alpine shortgrass meadows, patches of thawing snow, damp herbaceous slopes in the alpine, rarely also in groups in the subalpine zone, at 2,600–3,500 m. Centr. Asia: Pam.-Al. (from the Turkestan and Zeravshan ranges in the north to Darvaz, inclusive; occasionally in Shugnan). Endemic. Described from the upper reaches of the Yagnob River. Type in Paris.

134. *R. komarovii* Freyn in Bull. Herb. Boiss. 2 sér. (1903) 558. — *R. winkleri* Kom. in Tr. SPb. Obshch. Estestv. XXXVI (1896) 59, non Freyn in Willk., Prodr. fl. Hisp. III (1890) 920 et 298.

Perennial; fibrous roots tuberculate-conical; stems erect, 35–60 cm, almost always branched from the middle or above, especially in lower part; covered with spreading straight white hairs, leaves biternate or tripinnatisect, their lobes cuneate-lanceolate, lobulate or entire, margins and veins long-ciliate; radical leaves long-petioled, the blade broad-ovate in outline; lower cauline leaves similar to the radical, short-petioled; upper cauline leaves sessile, 2–3-partite, with entire lanceolate lobes; flowers golden yellow, to 1–2 cm in diameter; sepals whitish, half the length of the petals, lanceolate-elliptic; petals broad-obovate, short-tapering to base; receptacle linear-lanceolate or long-cylindric, with lanate collar; fruiting head cylindric, rarely ovoid-cylindric; fruitlets glabrous, green, small, flattened, with winged border, the straight beak as long as or shorter than the ripe ovary, glabrous, with isolated obscure hairs when young, with short hamate tip. April–May. (Plate XXXIII, Figure 3).

Steppe slopes in foothills. — Centr. Asia: Pam.-Al., T. Sh. Endemic. Described from Zeravshan. Type in Leningrad.

135. *R. dilatatus* Ovcz., sp. nova in Addenda VI, p. 576.

498 Perennial, closely related to the preceding species; radical leaves tripartite, the lateral segments sessile or subsessile, the middle segment broad-petioled, all segments broader in outline [than in preceding species], more or less broad-rhombic, deeply tripartite but not to base, with oblong-cuneate apically broadened dentate-incised lobes; flowers to 2 cm in diameter; fruiting head cylindric. May.

Woody-shrub zone (?). — Centr. Asia: T. Sh. Described from the vicinity of Alma-Ata in Tien Shan. Type in Leningrad.

136. *R. walteri* Rgl. ex Freyn in Bull. Herb. Boiss. 2, sér. III (1903) 558; Kom. in Tr. SPb. obshch. estestv. XXXVI (1896) 57 (sub *R. meins-hauseni*).

Perennial; 20–25 cm high, sericeous, mostly one stemmed; thickened roots oblong-ellipsoid, in a compact bundle; stems branched distally, 3 or 4-flowered, the peduncles elongating in fruit, covered with appressed slender hairs, somewhat sulcate, at anthesis often somewhat drooping distally; radical leaves appressed-hairy, oblong or oblong-ovate in outline, pinnatipartite, the lower lateral segments sessile or short-petioled, unequally tripartite, with lanceolate or linear-lanceolate entire or somewhat incised lobes, the middle segments sessile, 2–3-incised or partite with narrow-lanceolate lobes, the upper segment petiolate, deeply tripartite, with lanceolate cuneate lobes, entire or with 1–2 teeth, the middle lobe deeply and acutely tridentate, with distant lateral teeth, rarely the upper segment tripartite to the middle with broader entire lobes; cauline leaves sessile or subsessile, deeply tripartite with subacute linear-lanceolate segments, sometimes with 2 additional lower lateral lanceolate entire segments; peduncles covered with appressed short hairs, distinctly canaliculate in fruit; flowers yellow, 2–2.5 cm in diameter, 5-merous; sepals ovate, more or less spreading, half to two-fifths the length of the petals, yellowish-fimbriate, covered with slender hairs; petals obovate, tapering proximally; receptacle slender, cylindric, covered with short hairs; fruiting head 1.1–1.5 cm long, 0.8–0.9 cm broad, oval-ellipsoid or oblong-ellipsoid; fruitlets flat, orbicular or more or less rounded-elliptic, 6–6.8 mm long (with beak), 3.5–4 mm wide, glabrous, with appressed ciliate hairs confined to the margin, especially the dorsal margin, with a very thin border, the beak long, 2.5–3.1 mm, falcately or arcuately curved, broadened or very slender proximally, somewhat hamate in upper part and at the tip. April.

Low mountains in the Kopet Dagh Range. — Centr. Asia: Mtn. Turkm. Endemic. Described from Turkmenia. Type in Leningrad.

137. *R. pinnatisectus* M. Pop. in N. A. Dimo, Pochv. Eksped. v bass. r. r. Syr-Dar'i i Amu-Dar'i I (1915) 51; Pop. in Sched. ad Herb. Fl. As. Med. (1925) 11. — *R. linearilobus* Rgl. in A.H.P. V (1877) 220 p. pte; Kom. in Tr. SPb. obshch. estestv. XXXVI (1896) 58 pr. pte. — *R. sewerzovi* Rgl. in A.H.P. V (1877) 221 p. pte.; *R. samarkandicus* Lipsky in sched. — Exs.: H.F.A.M. No. 147.

Perennial, 14–35 cm high; thickened roots short-cylindric; radical leaves with appressed-hairy petioles, the blade ovate or oblong-ovate in outline, once or twice pinnatipartite, the segments more or less petiolate, more or less deeply 2–3-partite, the terminal lobes short, oblong-linear, subacute; cauline leaves few, mostly trisected, their segments tripartite, those of upper leaves entire, linear; all leaves appressed-hairy; stems with spreading branches from the middle or lower parts, mostly few-flowered, distally covered with appressed grayish fragile straight hairs; peduncles erect, more or less divergent, obscurely sulcate; sepals more or less oblong-elliptic, obtuse, divergent, with more or less erect rigidulous hairs, 4 mm long, slightly more than half the length of the petals; petals 7–10 mm long, yellow, obovate, tapering to base; receptacle linear-cylindric; fruiting head elongate-cylindric, 1.6–2.2 mm long, 5–6 (7) mm in diameter;

fruitlets 2.5 mm long, much flattened, somewhat irregularly orbicular, pubescent, the beak straight from base, becoming curved from base, somewhat recurved or straight distally. March–May. (Plate XXXII, Figure 2).

Among ephemeral spring vegetation, e.g., *Aegilops triuncialis*, sedge, bluegrass, and other meadow varieties, on argillaceous loess foothills, and enters the zone of forb and wheatgrass, as well as the lower part of the woody-shrub zone, rarely on rocks in small depressions, in sands at 400–1,800 m. — Centr. Asia: Kyz. K., Mtn. Turkm. (Kushka area), Amu D., Syr D., Pam. -Al., T. Sh. (W.). Endemic. Described from the vicinity of Katta-Kurgan. Type in Tashkent.

138. *R. linearilobus* Bge. in Arb. d. naturforsch. Ver. zu Riga I (1848) 122; E. Regel in A.H.P. V (1877) 220 (ex pte).

Perennial, 18 (27) cm high, grayish-hairy, with appressed hairs on petioles and at summit of stem; roots partially thickened, fusiform, often cordlike, slender; radical leaves tripartite; the middle segment, sometimes also the lateral, more or less petiolate, deeply 2–3-sect, with terminal long linear lobes, subobtusate, often curved, rarely the leaves tripartite with linear lobes, sometimes the segments of the first order entire; cauline leaves sessile, the lowermost subsessile, tripartite with linear entire segments, the middle segment linear sessile; stems more or less weak, scarcely sulcate, appressed-hairy like the petioles, simple or slightly branched above the middle; flowers 15–17 mm in diameter; sepals more or less appressed-hairy, shorter than petals, ovate, yellowish or yellowish-green; petals obovate, yellow; fruiting head ovoid or globose, 6–12 mm long, to 5–9 mm broad; fruitlets much flattened, small (3–4 mm long), glabrous, with a straight long distally curved beak. March–May. (Plate XXXII, Figure 3).

Gravelly slopes, depressions in sands, and loess foothills. — Centr. Asia: Kyz. K., Mtn. Turkm., Amu D., Syr D., Pam. -Al. (NW). Endemic. Described from Central Asia. Type in Leningrad.

Note. In the Khodzhent District (Mt. Mogol-tau) there occur aberrant plants with stems and petioles covered with spreading hairs, with small fruiting heads, and with more profusely branched stems. The pubescence and shape of leaves, described by M. G. Popov and *R. linearilobus* subsp. *mogoltavicus* M. Pop. (in Sched. ad Herb. Fl. As. Med. 1925, f. VI, p. 9, No. 143) bring it close to *R. sewerzowii*, and it may prove to be a hybrid between the latter and *R. linearilobus*.

139. *R. tenuilobus* Rgl. ex Kom. in Tr. SPb. Obshch. Estestv. XXXVI (1896) 59; Fedch., Consp. Fl. Turk. I, 8.

Perennial, 17–25 (30) cm high, with thickened fusiform roots; stems solitary, tall, slightly branched only distally, with long spreading hairs; radical leaves numerous, long-petioled, like the cauline leaves (except the uppermost) broad-ovate in outline; cauline leaves petiolate, with blade tripartite 3–4-pinnatisect, their thin flat lobes pinnatipartite with linear-lanceolate lobules; uppermost leaves short-petioled or subsessile, divided

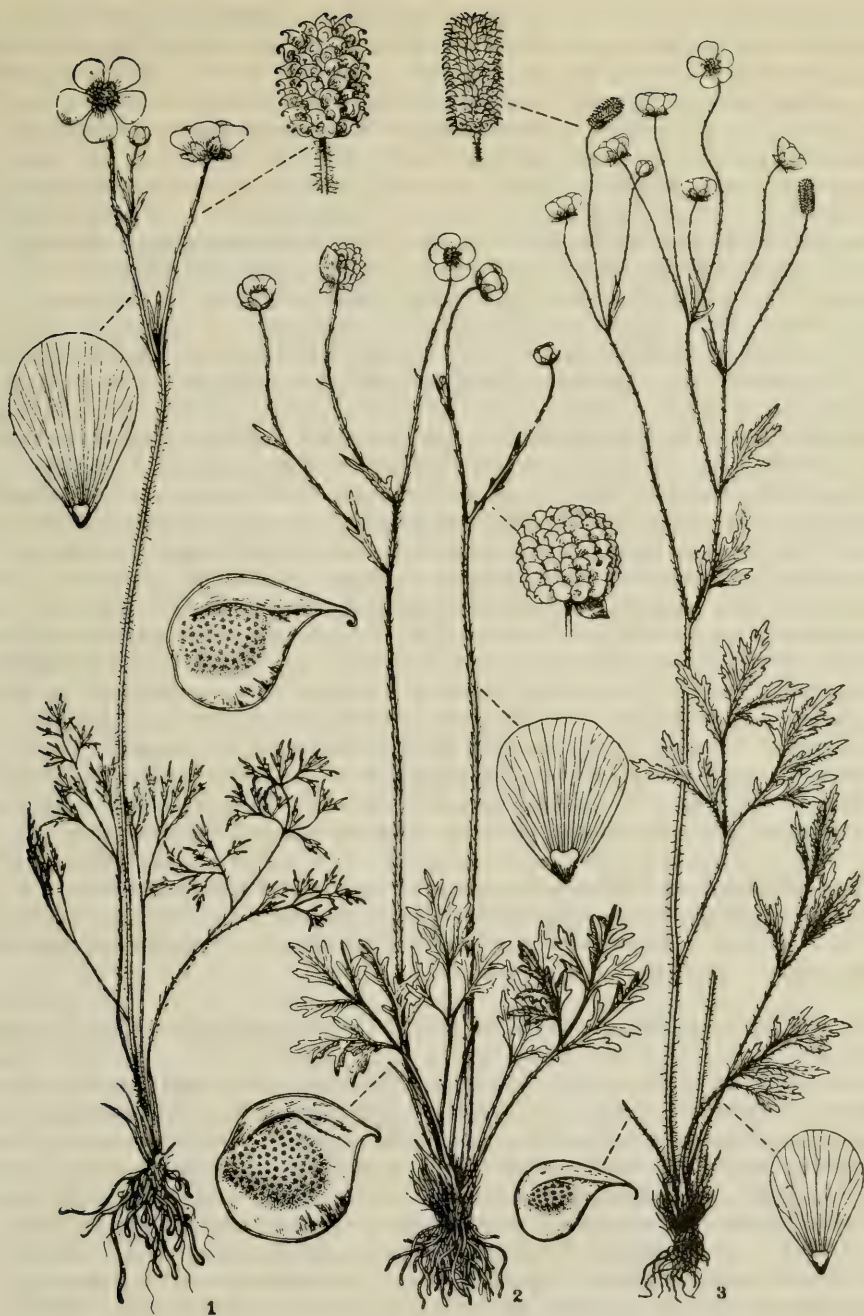


PLATE XXXIII. 1—*Ranunculus regelianus* Ovcz., nectary, fruiting head, and fruitlet; 2—*R. platyspermus* Fisch; 3—*R. komarovii* Freyn.

like the other leaves or deeply divided into slender lobes; flowers yellow or greenish yellow, 15 mm in diameter; sepals yellowish-greenish, more or less appressed, somewhat hairy, 3–3.5 mm long, half to two-fifths the length of the petals; petals yellow, somewhat oblong-obovate, more or less tapering to a clawlike base, 7–9 mm long; fruting head oblong-ellipsoid, to 6 mm long; fruitlets small, more or less elliptic, slightly convex, with scattered or isolated hairs, rarely glabrate, narrowly winged dorsally and ventrally, the beak short, curved from base, with hamate tip. April–May.

Herbaceous slopes in the lower woody-shrub zone and among shrubs at 1,300–2,100 m. — Centr. Asia: Pam.-Al., T. Sh. (Fergana Range).

Endemic. Described from the Pamir-Alai Range. Type in Leningrad.

140. *R. severzovii* Rgl. in A. H. P. V (1877) 221, ex pte. — *R. severzovii* ssp. *Winkleri* Pop. in Sched. ad Herb. Fl. As. Med. (1925) 12. — Exs.: H.F.A.M., No. 149.

503 Perennial, 30–40 cm high; most roots tuberous, fusiformly thickened; stems solitary, with spreading drooping hairs in lower part and slightly appressed long hairs in upper part, with grayish brown remnants of sheaths and petioles at base, with a tuft of hairs on the crown; radical leaves long-petioled, more or less large, tripartite, with petiolate, oblong-lanceolate entire or 2–3-partite and often incised segments (rarely the lateral segments subsessile), the petioles with dense spreading hairs; cauline leaves sessile or subsessile, 2–3-partite, with cuneate oblong entire or coarsely dentate lobes; flowers large, 2.5 cm in diameter; sepals greenish or brownish-greenish, very hairy, ovate or elliptic, obtuse, divergent, slightly more than half the length of the petals; petals broadly obovate-rounded; style long, straight, distally curved, glabrous or dorsally tuberculate; receptacle glabrous, linear-cylindric; fruiting head ovoid or rounded-oblong, 1.5–2 cm long, 1.6–1.2 broad; fruitlets 7–7.5 mm long, 5–6 mm wide, much flattened, orbicular, narrow-winged, the beak long, 3–3.5 mm, straight, with hamate involute tip when mature. April–May.

Stony habitats, argillaceous semidesert wormwood stands, loess foothills with ephemeroïd vegetation — *Poa bulbosa* and *Carex pachystylis*. — Centr. Asia: Syr D., T. Sh. (W.). Endemic. Described from Central Asia. Type in Leningrad.

141. *R. leptorrhynchus* Aitch. et Hemsl. in Transactions of the Linnean Society of London, III (1888–1894) 29. — Ic.; l. c., tab. I.

Perennial, 20–40 cm high; roots fascicular, some long and slender, others elongated, tuberously thickened; radical leaves petiolate, more or less broad-ovate in outline, tripartite, the middle segment petiolate, mostly trilobate or tripartite, with oblong entire or dentate lobes, the lateral segments entire or bilobate, sometimes more or less deeply trisected, the leaf blade appressed-hairy, the petioles distally more or less spreading-hairy; lower cauline leaves tripartite with lanceolate acute lobes, sessile, upper leaves simple, linear; stems slightly branched, somewhat flexuous, with numerous fibrous remains of leaves at base, with spreading upright hairs proximally and with appressed hairs distally; flowers 1.5–2 cm in diameter; sepals more or less appressed or somewhat spreading, ovate-elliptic, obtuse, with long slightly spreading hairs, to 7 mm long; petals broad-obovate, longer than sepals, 9–10 mm; fruiting head compact, more

or less oblong, 1.5–2.6 cm long, 0.8–1.0 cm broad; fruitlets orbicular, flat, with long hairs at the margin, the beak long, 2–3 mm, straight, laterally inclined, hamate-curved distally. March–May. (Plate XXXII, Figure 1).

Herbaceous slopes in low mountains and stands of tree and shrub vegetation—rose thickets, pistachio groves, etc.—Centr. Asia: Mtn. Turkm., Syr D., Pam. -Al. **Gen. Distr.:** Iran. Described from Afghanistan. Type in London.

142. *R. alpigenus* Kom. in Tr. SPb. Obshch. Estestv. XXXVI (1896) 56. — *R. aucheri* B. Fedtsch., Consp. Fl. Turk. I (1906) 8, non Bois.

Perennial, 11–20 (26) cm high, elongating in fruit; some roots thickened, cordlike or cylindric, others slender, fibrous, branching; stems mostly solitary, simple or distally branched, with 1 or 2 or several flowers, covered with weak flexuous spreading and in upper part semiappressed white hairs; radical leaves petiolate, the petioles covered with slender hairs or glabrous, broadened into whitish scarious sheaths, the blade more or less broad-ovate in outline, mostly ciliate-hairy beneath, glabrous above, compoundly tripartite, middle segment long petiolate, tripartite almost up to base, with oblong-linear or oblong-lanceolate, basally somewhat tapering lobes, apically trifid into narrow oblong or linear rounded teeth, the lateral teeth divergent, the lateral segments mostly short-petioled, with narrower sublinear lobes and lobules; cauline leaves sessile, small, with hairy amplexicaul sheaths, tripartite, with linear entire or subentire lobes, usually with short-ciliate margin; flowers 1.3–2 cm in diameter, diameter, mostly with several converging greenish-yellowish sepals, more or less divergent, hairy, recurved; petals 5 (occasionally up to 7 or 8), 1–1.4 cm long, more or less oblong-ovate, often somewhat crenate, cuneate; receptacle glabrous; fruitlets 2.5–3 mm long, unequally obovate, flattened, with a slender 1–1.2 mm involute-tipped beak, covered with sparse long slender hairs, subsequently glabrous. May–August. (Plate XXXI, Figure 5).

Steppe slopes in the subalpine zone at 2,000–4,000 m (in the Pamir). — Centr. Asia: Pam. -Al. (in the Pamir confined to the western part).

Gen. Distr.: Afghanistan. Described from the Zeravshan Range. Type in Leningrad.

143. *R. elbrusensis* Boiss. Fl. Or. 1 (1867) 34; N. Busch in Fl. cauc. crit. III, 3 (1903) 176.

Perennial, closely related to *R. aucheri* Boiss., from which it is distinguished by more thickened, shorter, oblong-cylindric auxiliary roots, by more broadly ovate fruitlets, by a shorter beak (to 1–1.3 mm), and by short-petioled, sometimes subsessile, cuneate, wider segments of radical leaves; these deeply ternate, their lobes obtusely dentate-incised, cuneate-ovate in outline; stems more or less simple or branched, with erect nondiverging branches. May. (Plate XXXI, Figure 6).

Subalpine zone of mountains. — Caucasus: S. Transc., Tal. **Gen. distr.:** Iran. Described from Mt. El'brus. Type in Geneva; cotype in Leningrad.

Note. In the Herbarium of the Botanical Institute there are specimens of doubtful origin, collected by Shovits in Armenia and Azerbaijan.

144. *R. platyspermus* Fisch. in DC., Prodr. I (1824) 37; Lbd., Fl. Alt. II, 306; Lbd., Fl. Ross. I, 99. — *R. schrenkianus* Fisch et Mey. ex Trautv. in Bull. Soc. Nat. Mosc. XXXIII (1860) 64.

Perennial, 17–22 (27) cm long, sometimes with creeping shoots; elongated, thickened, in a dense compact bundle; radical leaves petiolate, covered with flexuous soft hairs, once or twice tripartite, their multidentate pinnatifid segments with oblong terminal lobes; stem simple or slightly branched distally, few-flowered, mostly solitary, erect, straight, with flexuous appressed hairs, mostly sulcate, with 2–3 leaflets above the middle; lower cauline leaflets to 2–3 cm long, mostly trisected into elongate, linear or oblong-linear lobes, hairy, especially basally, the upper leaflets entire, linear; peduncles elongated, terminal and axillary, the short ones more or less sulcate, somewhat hairy; sepals hairy, obtuse; petals obovate, rounded, yellow, almost twice as long as sepals; fruiting head globose, 0.75–1 cm in diameter, not compact; receptacle glabrous, short; fruitlets suborbicular, 4 (3) mm in diameter, slender, flattened, with a very narrow winged border, glabrous, smooth, the beak marginal, very short, 0.2–0.4 mm, hamate-curved from the very base. April–May. (Plate XXXIII, Figure 2).

Semidesert-steppe and desert zone, mainly in sandy and sandy-loam soil. — European part: L. V.; W. Siberia: Alt.; Centr. Asia: Ar. -Casp., Balkh., Dzu. -Tarb., Kyz. K., Kara K., Syr D., T. Sh. (foothills). Gen. distr.: Dzu. -Kash. Described from Lake Inder. Type in Geneva.

145. *R. meinshauseni* Schrenk in Bull. Acad. Sc. Petersb. III (1845) 309; Traut. in Bull. Soc. Nat. Mosc. XXXIII (1860) 65.

506 Perennial, 30 cm high; roots fascicular, fusiformly thickened-inflated, oblong; radical leaves numerous, petiolate, with scattered slightly spreading hairs, the blade ovate, 2.5–3 cm long, tripartite, with ternately dissected segments; segments of the first order petiolate, or the lateral segments sessile; segments of the second order tripartite, with oblong apically broadened thrice unequally dentate lobes; petioles 3–5 cm, with spreading hairs and a short sheath; stem simple, more or less spreading hairy, branched above the middle, few-flowered, more or less sulcate; lower cauline leaves short-petioled, upper leaves sessile, hairy, dissected into 3 oblong tridentate segments, the uppermost bracts entire; peduncles 1–3 (4), the lateral abbreviated, weak, the terminal elongated, not straight, more or less appressed-hairy; flowers 1.8–1.9 cm in diameter; sepals not persistent in fruit, half the length of the petals, hairy on the outside, recurved; petals 8 mm long, more or less broad-obovate, rounded, yellow; nectariferous gland hidden under a scale infundibularly fused for half its length, tapering to base, broadened apically; style straight from base, with hamately involute tip (fruit not seen). May.

Boggy localities in foothills. — Centr. Asia: Dzu. -Tarb. (Dzungarian Ala Tau). Endemic. Described from the Dzungarian Ala Tau. Endemic. Described from the Dzungarian Ala Tau. Type in Leningrad.

Note. This species has not yet been properly studied; in the herbarium it is represented merely by the very old collections of Schrenk. According to M. G. Popov, who has observed this plant in the field, it is clearly distinguished from *R. regelianus* by the reflexed sepals. In general appearance it resembles species of the group *Xiphocoma*.



PLATE XXXIV. 1—*Oxygraphis glacialis* Bge; 2—*O. vulgaris* Freyn; 3—*O. chamissonis* (Schlechtld.) Freyn.; 4—*Halerpestes salsuginosa* (Pall.) Green. 5—*H. ruthenica* (Jacq.) Ovcz.

146. *R. regelianus* Ovcz. in Bull. Soc. Nat. Mosc. XLIV (1935) 267. — *R. platyspermus* Trautv. (non Fisch.) in Bull. Soc. Nat. Mosc. XXXIII (1860) 64. — *R. meinshauseni* Rgl. (non Schrenk) in A.H.P., V (1877) 221 et auct. fl. Turk.

Perennial, 25–30 (56) cm high, with a dense bundle of elongated cordlike thickened roots; radical leaves long-petioled, covered with forward pointing soft hairs, the blade more or less ovate, to 3–5 (–8) cm long, 2–3 times dissected, segments of the first and (partially) second orders, petiolate, segments of the third order divided-dentate, the terminal lobes linear, elongate, divided-dentate; stem solitary, simple or slightly branched distally, few-flowered, with forward pointing appressed flexuous hairs, more or less sulcate, with 2–3 bracts compoundly divided or tripartite, with linear lobes; flowers 2–2.7 cm in diameter; sepals deciduous, 6 mm long, not persistent in fruit, oblong-elliptic, rounded, somewhat hairy on the outside; petals more or less broad-obovate, rounded, yellow, almost twice as long as sepals, 11–21 mm long; fruiting head more or less ovoid or ovoid-rounded; fruitlets irregularly orbicular, with a proximally attenuate ventral part to 5 mm in diameter, glabrous, flattened with a winged border, the beak somewhat displaced toward the back, straight, hamate-curved distally. May–June. (Plate XXXIII, Figure 1).

Steppe and meadow areas in the subalpine and forest zones. — Centr. Asia: Dzu. -Tarb., T. Sh., Pam. -Al. (confined to the Alai Range). Described from Tien Shan. Type in Leningrad.

Genus 538. **TRAUTVETTERIA** FISCH. ET MEY.*

Fisch. et Mey. in Ind. sem. Horti Petropol. I (1835) 22; Prantl in Engl. u. Prantl, Pflzfam. III, 2 (1891) 64; Huth in Engl. Bot. Jahrb. XVI (1893) 286.

Perennials; sepals mostly 4, rarely 5, caducous, elliptic, sometimes slightly emarginate, boat-shaped, with involute sparsely short-ciliate margins, often somewhat reddish brown, to 3–3.5 mm long; petals absent; stamens numerous, to 6–8 mm long, all fertile, more or less flat, broadened distally, [filaments] abruptly narrowed distally; anthers short-elliptic, to 0.6–0.7 mm long; fruitlets 1-seeded, dry, indehiscent, with 2 very conspicuous lateral longitudinal and [two] marginal veins, thus the fruit somewhat tetragonous; ovule ascending, borne on ventral margin.

Note. Only one species in the USSR; a second, very closely related species, (*T. palmata* Fisch. et Mey.) is distributed in North America. Prantl (l. c.) supposes that it is related to *Oxygraphis*, but, following Huth, I believe this view to be entirely unfounded. Nor can I agree with Huth (l. c., p. 287) that the genus most closely related to *Trautvetteria* is *Thalictrum*. Rather, I propose that *Trautvetteria* should be placed between *Thalictrum* and the North American *Cyrtorhyncha* Nutt.

* Treatment by P.N.Ovchinnikov.

1. **T. japonica** Sieb. et Zucc. in Abhand. d. Bayer. Acad. IV (1846) 184; Kom., Fl. Manchzh. II, 801. — *T. palmata* Korsh. in A.H.P. XII (1892) 301, non Fisch. et Mey. — *T. palmata* var. *japonica* Huth in Engl. Bot. Jahrb. XVI (1893) 288. — *Ranunculus pleurocarpus* Maxim., Prim. Fl. Amur. (1859) 91. — Ic.: Iconogr. pl. Nippon. X (1910) t. 45. — Exs.: HFR No. 2506.

Perennial, 50–70 cm high, with a bundle of threadlike slender root fibers; stems large, somewhat flexuous, hollow, glabrous like the leaves; radical leaves long-petioled, without sheaths, the blade glabrous, with scattered short hairs beneath, broadly reniform or orbicular in outline, deeply tripartite, with approximate or almost contiguous large broad segments, the middle segment much narrower than the lateral, more or less elliptic or oblong-rhombic, tapering to base, deeply incised and acutely serrate-dentate, the lateral segments 2–4-sect to the middle into rhombic or lanceolate-rhombic, mostly trifid and incised-serrate-dentate acute lobes; cauline leaves petiolate, broadly ovate-reniform [in outline], similar to the radical leaves or unequally 5–6-partite to the middle or beyond, with oblong-rhombic incised-serrate-dentate lobes; radical leaves [sic!] entire, or tripartite with elongate-rhombic serrate-dentate lobes; peduncles finely striate, with short slender crisp hairs; inflorescence semipaniculate; sepals 4, deciduous at anthesis, more or less elliptic, curved, with involute scarcely ciliate margins and an incurved somewhat cucullate tip; petals usually obsolete, occasionally isolated, elongate, oblong-cuneate, truncate, to 5–6 mm long, whitish-yellowish; fruiting head loose, globose, of 12–15 fruitlets; receptacle glabrous; fruitlets with marginal and 2 lateral ribbed veins, sometimes with 2 additional short veins emerging from the back, the beak short, to 0.5 mm, straight, hamate-curved distally. June–July.

Beside forest rivulets, in floodplain forests, valleys, riverbanks, sandy banks, etc. — Far East: Ze.-Bu., Uda, Uss., Sakh. *Gen. dist.*: Jap. -Ch. Described from Japan. Type in Munich (?).

Genus 539. **THALICTRUM** * L.**

L., Gen. Pl. ed. I (1737) 164.

Perianth simple, caliciform, of 4, very rarely 5 deciduous segments; stamens numerous, longer than perianth segments; pistils few or rather numerous, distinct, unicellular, with 1 ovule; style abbreviated, sometimes obsolete; fruitlets sessile or stalked, with persistent style and stigma. Annuals with alternate pinnatipartite leaves and numerous small flowers.

Note. Of all the systems proposed for *Thalictrum* L., the best seems also to be the oldest, which was published by de Candolle in 1818 (Syst. I, p. 168–172); it is followed below.

- | | | |
|----|---|----|
| 1. | Fruitlets with winged ribs | 2. |
| + | Fruitlets with wingless ribs | 3. |
| 2. | Fruitlets pyriform, more or less cuneately narrowing to a stalk | |
| | 1. <i>T. aquilegifolium</i> L. | |

* From the Greek *thalictron*, Dioscorides' name for a certain medicinal plant.

* * Treatment by S.A.Nevskii.

- + Fruitlets ovoid-ellipsoid or obovoid, abruptly narrowing to a stalk
..... 2. *T. contortum* L.
- 511 3. Leaves ternate or 2-3-pinnate 4.
+ Leaves 2-4-pinnate 7.
4. Plants with large radical leaves; achenes with short stalks 5.
+ Plants without radical leaves; achenes sessile 6.
5. Cauline leaves paired, opposite, simple; rootstock creeping, with
slender roots 7. *T. filamentosom* Maxim.
+ Cauline leaves paired, approximate, ternate or biternate; roots
fusiform, tuberous 6. *T. tuberiferum* Maxim.
6. Fruitlets 3, straight 8. *T. triternatum* Rupr.
+ Fruitlets usually 4-8, falcately curved 9. *T. sultanabadense* Stapf.
7. Filaments clavately dilated distally, thicker than the anthers 8.
+ Filaments slender, not dilated distally 12.
8. Fruitlets short-stalked, pendent or more or less declinate 9.
+ Fruitlets sessile, erect 11.
9. Fruitlets inflated (not compressed), woody, globose-obovoid, small,
2.5 mm long, 2 mm broad, with anastomosing veins
..... 5. *T. baicalense* Turcz.
+ Fruitlets flattened, soft, obliquely obovoid larger, 4.5-6 mm long,
2.5-2.75 mm broad, with arcuate veins 10.
10. Flowers few, borne singly at tip of stems and branches
..... 3. *T. sparsiflorum* Turcz.
+ Flowers in a small terminal nonumbellate panicle
..... 4. *T. sachalinense* Lecoyer.
11. Flowers white or slightly pinkish; achenes ovoid, stout, 3.5-4 mm
long, 2-2.5 mm 10. *T. petaloideum* L.
+ Flowers greenish; achenes semifusiform, 2-3 mm long, 1 mm broad
..... 16. *T. podolicum* Lecoyer.
12. Inflorescence a simple, very rarely a scarcely branched raceme.
A very small, 5-15 cm high, alpine or Arctic plant
..... 11. *T. alpinum* L.
+ Inflorescence branched, pyramidal, paniculate or corymbose.
Larger plants 13.
13. Inflorescence a compact, usually corymbose panicle; flowers not
nutant; perianth and filaments pale yellow; anthers obtuse or
subobtuse 14.
+ Inflorescence a more or less loose, oblong, ovoid or pyramidal
panicle; flowers usually nutant, reddish-brownish, with pendent
stamens; anthers acuminate 15.
512 14. Leaflets rounded-obovate, dull above 18. *T. flavum* L.
+ Leaflets narrow, linear or oblong, lustrous above
..... 19. *T. angustifolium* L.
15. Leaves crowded in lower part of stem, the leaflets very small, very
deeply divided, often almost to base, into 3 entire oblong lobes
..... 13. *T. isopyroides* C. A. M.
+ Leaves more or less irregularly spaced along the stem; leaflets
shallowly incised into broad, often detate lobes 16.
16. Plants with short glandular hairs, mainly on underside of leaflets
..... 12. *T. foetidum* L.
+ Plants glabrous, smooth 17.

17. Pistils and fruitlets 1-3; fruitlets large, 5-7 mm long 14. *T. squarrosum* Steph. ex W.
 + Pistils and fruitlets 5-12; fruitlets smaller, 2-4 mm long. 18.
 18. Stigmas sagittate; leaves bipinnate, more or less appressed to stem 17. *T. simplex* L.
 + Stigmas not sagittate; leaves 3-4-pinnate, spreading 15. *T. minus* L.

Section 1. **TRIPTERIUM** DC. Syst. I (1818) 168. — Fruitlets pendent, on long pedicels, with winged ribs. Filaments clavately thickened distally.

1. *T. aquilegifolium* L., Sp. pl. (1753) 547; Ldb., Fl. Ross. I, 5, p. pte.; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 1 (1861) 23, p. pte.; Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 150, p. pte.; Shmal'g., Fl. I, 5, pro max. pte. — *T. atropurpureum* Jacq., Hort. bot. Vindob. III (1776) 34. — Ic.: Rchb., Ic. Fl. Germ. III, tab. 36, fig. 4635. — Exs.: HFR No. 1451.

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Perennial; stem 40-100 cm high, glabrous, erect; leaves large, broadly triangular in outline, with horizontally spreading 2-3-pinnate blades, the lower leaves petiolate, the upper sessile, the petioles canaliculate above, glabrous like the leaves; stipules at base of petioles smallish, membranous, with rounded margins; leaflets 20-50 mm long, 5-40 mm broad, obovate or rounded-obovate, petiolate or sessile, slightly cordate or rounded, apically usually trilobate or obtusely tridentate, often with crenate-dentate lobes, green, glaucescent-green beneath; flowers numerous, in a corymbose panicle, pale lilac, rarely white, with 5-20 mm pedicels; perianth segments 4(5), oval, entire, obtuse; stamens numerous, the filaments colored, clavately dilated distally to thickness of anthers; anthers ovoid or ellipsoid, obtuse; pistils 5-20; ovaries long-stalked; style obscure; stigma 0.5 mm long; fruitlets pendent, pyriform or obovoid, more or less cuneately tapering to a 3-5 mm long stalk, obtuse, the beak 0.5 mm long, glabrous, very slightly compressed, tetragonous, curved, with membranous wings along the ribs (one narrower than the others); achenes 7-8 mm long, 3.5-4.5 mm broad. June — July (August). (Plate XXXV, Figure 3).

Forests. Felling areas and clearings mainly in broadleaf and mixed forests. European part: Kar. -Lap., Lad. -Ilm., Dv. -Pech. (rare: Arkhangel'sk, Ustyug), U.V., V. -Kama (very rare in western part of region: former Kazan Province), V. -Don, U. Dnp., M. Dnp. Gen. distr.: Centr. and S. Eur., Bal. -As. Min. (W.). Described from Europe. Type in London.

2. *T. contortum* L., Sp. pl. (1753) 547; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 1 (1861) 25. — *T. aquilegifolium* Ldb., Fl. Ross. I, 5, p. p. (quoad pl. sib.); Turcz., Fl. baic. -dah. I, 27; Komarov, Fl. Mansch. II, 1, 303; Ej. Fl. Kamch. II, 154; Kryl., Fl. Zap. Sib. V, 1211, non L. — Ic.: Somoku Dzusetzu ed. Makino X, t. 41 (1910).

Perennial, very similar to *T. aquilegifolium*, but often stronger, mainly distinguished by shape of achenes; stem 50-200 cm high; leaves as in *T. aquilegifolium*; flowers in a large corymbose panicle, lilac or white, pedicels 1-5 cm long; perianth segments oval, obtuse, 4-5 mm

long and 2–2.5 mm broad; stamens 7–9 mm long, the colored filaments distally dilated to thickness of anthers (0.5 mm); pistils half as long as stamens; ovaries with slender stalks, to 2 mm long; fruitlets pendent from stalks, 3–5 mm long, ovoid-ellipsoid or obovoid-ellipsoid, abruptly narrowed apically (not tapering as in *T. aquilegifolium*), apex rounded, with beak curved to the side, 0.5–0.75 mm long, tetragonous, with membranous wings along the ribs, 3 of the wings wide, the fourth along the ventral vein, half as wide, the fruitlets 6–6.5 mm long, 3.5–4 mm broad. June–July. (Plate XXXV, Figure 4).

Forest and riverside meadows, forest margins, and shrub thickets. — W. Siberia: Ob (Vakh River valley), Alt. (Kurchum River basin); E. Siberia: Ang.-Say., Dau., Lena-Kol.; Far East: Okh., Kamch., Uda, Sakh., Ze.-Bu., Uss. **Gen. distr.:** Jap.-Ch. Described from Siberia. Type in London.

Section 2. **PHYSOCARPUM** DC., Syst. I (1818) 171. — Fruitlets short-stalked, more or less pendent or divergent, with distinct veins, anastomosing in some species. Filaments clavately dilated distally.

514 3. **T. sparsiflorum** Turcz. ex Fisch. et Mey., Ind. Sem. Hort. Petrop. I (1835) 40; Ldb., Fl. Ross. I, 5; Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 155, p. p.; Kom., Fl. Kamch. II, 154; Kryl., Fl. Zap. Sib. V 1212. — Ic.: Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 1 (1861) t. 1, fig. 1–2; Lecoyer, Monogr. t. 3, fig. 8.

Perennial, glabrous (distinguished from the North American *T. richardsonii* A. Gray); stem 30–60 (150) cm high; leaves exstipulate, broadly triangular, 2–3-pinnatifid, evenly spaced along stem, strongly declinate. Petioles of upper and lower leaves 1.5–2.5 cm, the uppermost leaves sessile; petioles very slender, green above, glaucescent-green below, rounded-ovate or suborbicular [in outline], 5–25 mm long, 4–15 (20) mm broad, scarcely cordate or rounded basally, petiolate, rarely sessile, broadly short-trilobate at the apex; flowers few, scattered, at summit of stem and tips of branches, whitish creamy, with pedicels 6–15 mm; perianth segments 4, oval, entire, glabrous, 2.5–3 mm long; stamens 10–15, the filaments slender, somewhat dilated distally, longer than the pistils; anthers ovoid, obtuse, ca. 1 mm long; fruitlets few (usually 4–7), pendent, with short (1) 1.5–3 mm stalks, obliquely broad-ovoid (dorsally straight, ventrally curved), flattened, with prominent arcuate veins, the beak slender, straight, 1–1.25 mm long, the fruitlets 4.5–6 mm long, 2.5–2.75 mm broad. June.

Boggy forests and dense herbaceous thickets on banks of mountain rivers and streams. Arctic: An.; W. Siberia: Ob (upper course of the Ket); E. Siberia: Yenisei, Lena-Kol., Dau., Ang.-Say.; Far East: Kamch., Okh., Uda, Ze.-Bu., Uss. (NE). **Gen. distr.:** N. Korea. Described from Dauria. Type in Leningrad.

4. **T. sachalinense** Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 152, p. p.

Perennial; stem 40–60 cm high, glabrous; leaves distant, 2–3-pinnate, stipulate, petiolate or subsessile, at point of branching, leaflets always narrow, delicate, large, 20–50 mm long, 10–40 mm broad, obovate, petiolate or subsessile, slightly cordate or rounded-cuneate, distally tridentate or trilobate, the lobes undivided, with large obtuse teeth, glabrous; inflorescence a terminal few-flowered semiumbellate panicle; flowers large, pale pinkish, with 10–40 mm pedicels; perianth segments 4 (5), 3–4 mm long, 2–3 mm broad, ovate, entire; stamens numerous, the filaments 4–6 mm long, clavately thickened distally to width of anthers or slightly wider; anthers 1 mm long, linear, obtuse; pistils 5–9; immature fruitlets short-stalked, identical with those of *T. sparsiflorum* Turcz., the beak as long but reflexed (style persistent). June–July.

Far East: Sakh. Endemic. Described from the Otekhkoro area. Type in Leningrad.

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Note. This species is very closely related to *T. sparsiflorum*, the only visible difference being the type of inflorescence. Attached to the type specimen there is a small packet with mature achenes belonging to another species, namely *T. minus* β *sibiricum*. This led Lecoyer into an unfortunate error, for he described them as belonging to his species. In the illustration (Plate III, Figure b) he showed characters based on them; other characters (e.g., shape of beak) he described after immature achenes of *T. sachalinense* *sensu stricto*.

5. *T. baicalense* Turcz., Fl. baic.-dah. I (1842) 28; Ldb., Fl. Ross. I, 7; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 1 (1861) 26; Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 164; Kom., Fl. Manchzh. II, 1, 307. — *T. leiocarpum* Fries in Linnaea XXIX (1858) 730 (ex Lecoyer). — Ic.: Rgl., l. c., tab. II, fig. 2, c, d, e; Lecoyer, l. c., tab. III, Fig. 14. — Exs.: HFR No. 1002.

Perennial; stem 40–70 cm high, simple, glabrous, sulcate; leaves distant, short-petioled, 2–3-pinnatipartite, broadly triangular, the petioles broadened into a short sheath, with grayish brown-membranous and long-fimbriate margin; stipules absent at points of emergence of petioles; leaflets 10–35 mm long, 10–30 mm broad, rounded-obovate or suborbicular, sometimes reniform-rounded (the terminal leaflets), cordate or cuneate, apically trilobate with obtusely crenate-dentate lobes, green, almost concolor above and beneath, rather thin, glabrous, with very prominent veins beneath; flowers few, in a small corymbose panicle, whitish, small, with 5–20 mm pedicels; perianth segments 4, oval, 2–3 mm long; stamens numerous, the filaments whitish, proximally filiform, distally dilated almost to thickness of anthers; anthers oval, 0.5 mm long, obtuse; pistils 5–7, ovaries subsessile; style 0.5 mm long; fruitlets with a stalk ca. 0.25 mm long, glabrous, inflated, not compressed, globose-obovoid, small, 2.5 mm long (without beak), 2 mm thick, woody, the style (beak) persistent, slightly curved, ca. 0.75 mm long; veins rather numerous, anastomosing. May–June. (Plate XXXV, Figure 7).

Broadleaf forests, forest margins, mainly in soil with leaf humus. — E. Siberia: Ang. -Say., Dau.; Far East: Ze. -Bu., Uss., Uda. Gen. distr.: Manchuria, Kansu. Described from the shores of Lake Baikal. Type in Leningrad.

6. *T. tuberiferum* Maxim. in Bull. Acad. St. Pétersb. XXII (1876) 227; Lecoyer in Bull. Soc. Bot. Belg. XXV (1885) 161; Kom., Fl. Manchzh. II, 1, 307. — Ic.: Lecoyer, l. c., tab. III, Fig. 12.

516 Perennial; roots fusiformly tuberously thickened; creeping subterranean shoots absent; stems erect, 40–80 cm high, slightly faceted; leaves 3:1 radical, with a long 12–22 cm petiole, tritermately divided, with long petiolules of the first and second order and with large ovate terminal leaflets, basally broadened or slightly cordate, apically trilobate with obtusely crenate-dentate lobes; cauline leaves 2, opposite, in upper part of stem, ternate or biternate, short-petioled or sessile, with leaflets similar in shape to those of radical leaves but smaller and narrower (leaflets of all leaves 2.5–5 cm long, 1.5–3.5 cm broad); stipules absent; inflorescence terminal, with rather numerous flowers, in the form of an umbellate panicle with small leaflets at base of basal branches; flowers whitish, small, with 2–10 mm pedicels; perianth segments 4, ovate, ca. 2 mm long; stamens numerous, white, the filaments slender in their lower half, ovoid-inflated in upper half, 1 mm thick, 3–4 times as thick as the ovoid or ellipsoidal 0.5–1 mm anthers; pistils 4–7; ovaries subsessile; stigma sessile, oval; fruitlets with 3 mm long stalks, obliquely obovoid, straight, slightly flattened, straight dorsally, curved ventrally, with 8 prominent ribs, of which 3 are on each side, one dorsal, and one ventral, the fruitlets 5–5.5 mm long, 2 mm broad. June — July.

Shady coniferous and mixed mountain forests. — Far East: Uss. Gen. distr.: Jap. -Ch. Described from the Ol'ga Gulf area. Type in Leningrad.

7. *T. filamentosum* Maxim., Prim. Fl. Amur. (1859) 13; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 1 (1861) 27; Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 159 et 271; Kom., Fl. Manchzh. II, 306. — Ic.: Rgl., l. c., tab. II, fig. 1 (excl. b et c).

517 Perennial, small, 20–40 cm high; rootstock slender, creeping, with slender roots; leaves 3:1 radical, with a long (10) 12–20 cm petiole, the blade broadly triangular [in outline], biternately divided; cauline leaves 2, sessile, approximate (opposite), in upper part of the slender costate stem, simple; petiole of radical leaf exstipulate, petiolules of the first order 2.5–4.5 cm long, those of the second order much shorter; terminal leaflets of the radical leaf ovate or broad-ovate, 3–4 cm long, 2.5–3.5 cm broad, shallowly trilobate at the apex, the middle lobe coarsely and obtusely tridentate, the lateral lobes obtusely crenate-dentate or subentire, green above, glaucescent-green beneath; cauline leaves rounded-ovate, slightly cordate, one larger than the other, similar in type of dentation to leaflets of the radical leaf, all leaves glabrous; inflorescence terminal, few-flowered, umbellate, 1.5–2.5 cm long, 2.5–3.5 cm broad; flowers white, with 5–20 mm pedicels; perianth segments ovate, obtuse, entire, 2 mm long, ca. 1.5 mm broad; stamens numerous, white, the filaments very much thickened, distally 2–3 times as broad as the anthers, ca. 1 mm broad; anthers globose-rounded, obtuse, 0.25–0.5 mm long; pistils 3–5; ovary subsessile, 1–2 mm long; style undeveloped or almost undeveloped; stigma lateral, sessile, oval, 0.5–1 mm long; fruitlets subsessile or with short, (ca. 0.5 mm) stalks, glabrous, narrowly semioval, very slightly falcately curved, thus the dorsal surface concave, the ventral surface convex, 5 mm long, 1.5–2.75 mm broad, slightly flattened, with 8 prominent ribs (3 on each side, one

dorsal, and one ventral); stigma forming a persistent short curved beak. May — June.

Coniferous and mixed forests, especially Siberian stone-pine forests; growing in large groups in mossy soil. — Far East: Uss. Gen. distr.: Manchuria. Described from the vicinity of Geong and Tsyanka, on the lower course of the Amur. Type in Leningrad.

Section 3. *EUTHALICTRUM* DC., Syst. I (1818) 172. — Fruitlets sessile, rarely subsessile, with prominent longitudinal ribs. Filaments slender, rarely clavately dilated distally.

8. *T. triternatum* Rupr., Flora Cauc. (1869) 2; Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 172; Boiss., Fl. Or. Suppl. (1888) 2; N. Busch., Fl. cauc. crit. III; 3, 184, p. p. (excl. pl. ex Armenia turcica). — Ic.: Rupr., l. c., tab. I, fig. 1. — Exs.: Fl. Cauc. Exs. No. 107.

Perennial, stocky, (20) 30–50 cm high; stem glabrous, weak, with 2 grayish brown basal sheaths; leaves triternate, distant, petiolate or subsessile, the petioles exstipulate; leaflets smallish, usually 10–15 mm long, 5–10 mm broad, obovate, rounded-obovate, or suborbicular, rounded-cuneate or slightly cordate, glabrous on both surfaces, coarsely and obtusely tridentate at the apex, the teeth entire or with small obtuse teeth; inflorescence with few (usually 6) white flowers, with 5–10 mm pedicels; perianth segments 4, elliptic, entire, 4–6 mm long, 1–2 mm broad; stamens 15–20, the filaments distally very strongly clavately dilated; anthers 1 mm long, linear, obtuse; pistils 3; ovary sessile, 4–5 mm long; style 1 mm long; stigma broad, hastate, conical; fruitlets 3, linear, straight, each with 8 slender ribs. June — July.

Taluses and calcareous rocks in the alpine zone, rarely in shrub thickets in the subalpine zone. — Caucasus: Cisc. (W.), W. and E. Transc. (in the latter, confined to northern part, in Osetia). Endemic. Described from the northeastern slopes of the Shitlib Pass in the upper reaches of the Belaya River (former Kuban Region). Type in Leningrad.

518 Note. N. A. Bush's record for Turkish Armenia certainly refers to *T. sultanabadense* Stapf, distinguished by the filaments, which are obscurely dilated below the anthers, and by the characteristic falcately curved achenes with 3 more prominent ribs.

9. *T. sultanabadense* Stapf in Verhandl. Zool.-bot. Gesellsch. Wien XXXIII (1888) 550. — *T. trautvetterianum* Rgl., ex Kom. in Trav. Soc. Nat. Petersb. XXVI (1896) 48.

Perennial, small, glabrous, 10–30 cm high; leaves biternate, short-petioled sessile or exstipulate; leaflets 0.9–2 cm long, 0.8–1.8 cm broad, rounded-obovate or obovate, slightly cordate or rounded-cuneate, distally trilobate with 2–3-dentate lobes; inflorescence racemose with few flowers; flowers with long pedicels, produced in the axil of large ovate acuminate or broad-ovate, trilobate or even ternate bracts; perianth segments pinkish, obovate, acuminate, ca. 4 mm long; stamens 6–10, 5–6 mm long, the filaments scarcely dilated distally; anthers linear-clavate, 3 mm long; stigma long, curved; fruitlets usually 4–8, falcately curved, with concave dorsal surface, convex ventral surface, 3.5–4.5 mm long, 1.5–4 mm broad, with very

prominent ribs, the lateral ribs confluent at base, produced into an indurated persistent acuminate 1.25 mm long stigma. May—June. (Plate XXXV, Figure 8).

Rocks, stony slopes, slightly shady localities, near shrubs of *Amygdalus* and *Juniperus* trees (Pamir-Alai).—Caucasus: S. Transc.; Centr. Asia: Pam.-Al., Mtn. Turkm. Gen. distr.: Iran., Arm.-Kurd. Described from the vicinity of Sultanabad [Kashmar], northern Iran. Type in Vienna.

10. *T. petaloideum* L., Sp. pl. ed. 2 (1762) 771; Ldb., Fl. Ross. I, 6; Turcz., Fl. baic.-dah. I, 28; Rgl. in Bull. Soc. Nat. Mosc. XXXIV (1861) 28; Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 165; Kom., Fl. Manchzh. II, 1, 38; Kryl., Fl. Zap. Sib. V, 1213.—*T. stamineum* L. f. Suppl. (1781) 271.—*lc.*: Krascheninn. in Nov. Comm. Ac. Petrop. I, tab. 15, fig. 2; Deless., I, tab. 9; Lecoyer, *l. c.*; tab. III, fig. 15.—Exs.: HFR No. 951.

519 Perennial, glabrous; stems strong, low, (15) 20–40 (50) cm high, sulcate, often violet proximally; leaves glaucous-green or gray-green, crowded at base of stem (cauline leaves only 1 or 2, small), the blade broadly triangular in outline, 2–3-pinnate, 4–10 cm long, 3–8 cm broad, the lower leaves with 2–10 cm petioles; leaflets dull, without prominent veins on either surface, small, orbicular, reniform-rounded, obovate, or elliptic, 2–10 mm long, 1–6 mm broad, slightly cordate or rounded-cuneate, petiolate or sessile, deeply (2) 3-lobate, with very obtuse rounded lobes; flowers white or very slightly pinkish, erect, on 1–3 cm pedicels, in a dense corymbose panicle; perianth segments 4, ovate; stamens numerous, white, 6–8 mm long, 2.5–3 times as long as pistils, the filaments clavately dilated (0.75–1.25 mm thick) distally, almost twice as thick as anthers; anthers 0.5–1 mm long, elliptic, obtuse; pistils 4–13; ovary sessile; style filiform, 0.25–0.5 mm long; fruitlets sessile, ovoid, thick, not flattened, 3.5–4 mm, long, 2–2.5 mm in diameter, with 8 very prominent ribs, the persistent style forming an ca. 1 mm long beak, hamate or slightly curved distally. May—June. (Plate XXXV, Figure 5).

Gravelly steppe slopes, rarely steppes and steppe meadows.—W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau.; Far East: Ze.-Bu.; Centr. Asia: T. Sh. Gen. distr.: Dzu.-Kash., Mong., Jap.-Ch. (Korea, Manchuria). Described from Siberia. Type in London.

11. *T. alpinum* L., Sp. pl. (1753) 545; Ldb., Fl. Ross. I, 6; Turcz., Fl. baic.-dah. I, 28; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 1 (1861) 28; Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 193; Kom., Fl. Kamch. II, 153; Kryl., Fl. Zap. Sib. V, 1212; N. Busch, Fl. Cauc. crit. III, 3188.—*lc.*: Fl. Dan. t. 11; Lecoyer, *l. c.*, t. IV, fig. 13.—Exs.: HFR No. 501.

Perennial, small, with aphyllous, rarely 1-leaved simple stem, 5–15 (20) cm high; leaves crowded at base of stem, extipulate, with 1–4 cm petioles, pinnate and bipinnate, the blade 1.5–3 cm long, 1–2.5 cm broad; leaflets orbicular or rounded-obovate, distally obtusely 3–5-dentate, almost coriaceous, with slightly curved margins, dark green and more or less lustrous above, pale glaucous beneath, 3–5 (7) mm long and about as broad; flowers in a simple, rarely scarcely branched raceme, 1.5–8 cm long,

nutant; pedicels in the axil of 3–4 mm long oval or oblong-oval, apically more or less crenate bracts, 2–4 mm in fruit to 8 mm, arcuately curved; perianth segments reddish-brownish, 2–3 mm long, 1–1.75 mm broad, elliptic, obtuse; stamens 8–10, pendent, 5–6 mm long, with slender filaments 3–4 mm long, anthers linear, subobtusate, 1–2 mm long; pistils 3–5; ovary sessile, 1 mm long; fruitlets pendent, sessile or subsessile 0.75–1 mm broad. June–July. (Plate XXXV, Figure 1).

High-mountain tundras, rocks and moraines around glaciers, dry alpine shortgrass meadows, and tundras. — Arctic: Arc. Eur., Nov. Z., Arc. Sib., Chuk., An.; European part: N. part of the Central Urals; Caucasus: Main Range; W. Siberia: Alt.; E. Siberia: Ang. - Say., Lena-Kol., Dau.; Far East: Kamch.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. **Gen. distr.:** Mong., Ind.-Him., N. Am., polar-Arctic and alpine zones of W. Europe. Described from Lapland. Type in London.

12. *T. foetidum* L., Sp. pl. (1753); Ldb., Fl. Ross. I, 7; Turcz., Fl. baic.-dah. I, 30; Rgl. in Bull. Soc. Nat. Mosc. XXXIV (1861) 45; Boiss., Fl. Or. I (1867) 7; Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 181; Shmal'g., Fl. I, 5; N. Busch, Fl. cauc. crit. III, 3, 185; Kryl., Fl. Zap. Sib. V, 1214. — *T. styloideum* L., f. Suppl. (1781). — *T. sibiricum* L., Sp. pl. (1753) 546, p. p. — *T. acutilobum* DC., Syst. I (1818) 177. — *T. pubescens* C. A. M. Verzeichn. Pfl. Cauc. (1831). — *T. gracile* C. A. M. in Ldb., Fl. Alt. II (1830) 348, p. p. — Ic.: Rchb., Ic. Fl. Germ. III, tab. XXVI, fig. 4626; Lecoyer, l. c., t. IV, fig. 7. — Exs.: A. Kerner, Fl. exs. austr.-hung. No. 2560.

Perennial; entire plant covered with short glandular pubescence mainly developed on underside of leaves and consisting of short spreading hairs and small glands, very rarely the plant almost glabrous or covered with isolated small glands; stem (15) 20–50 (65) cm high, often violet proximally, with evenly spaced leaves; leaves 3–4-pinnate, petiolate or subsessile, with 1–4 cm exstipulate petioles, the blade broadly triangular, to 10–20 cm long and about as broad; leaflets small, orbicular, rounded-ovate or obovate, sometimes slightly cordate, trilobate, with ovate entire and obtusely 2–3-dentate lobes, the leaflets 2–15 mm broad; flowers small, often nutant, in a loose panicle; pedicels 0.5–3 (4) cm; perianth segments 4–5, ovate, 3–4 mm long, 1–2 mm broad, violet; stamens numerous, 2.5–3 times as long as pistils; filaments slender, 3–5 mm long; anthers yellow, linear, acuminate, 2–3 mm long; pistils 8–12; ovary 1 mm long, sessile; style 0.5–2 mm long; fruitlets sessile, ovoid or ovoid-oblong, flattened, 2–3.5 mm long, 1.5–2.5 mm broad, glandular-pubescent, longitudinally ribbed; beak ca. 1 mm long, straight or slightly curved. June–July. (Plate XXXV, Figure 2).

Gravelly slopes, bluffs, and rocks. — European part: V. - Kama (Urals); Caucasus: all regions; W. Siberia: Irt., Alt., Ob; E. Siberia: Ang. - Say., Dau., Lena-Kol.; Far East: Uss.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. (E.). **Gen. distr.:** W. Med., Centr. Eur., Bal.-As. Min., Arm.-Kurd. Iran., Dzu.-Kash., Mong., Tibet. Described from S. Europe. Type in London.



PLATE XXXV. 1—*Thalictrum alpinum* L., a) flower, b) fruitlet; 2—*T. foetidum* L., leaf, a) branch with fruit; 3—*T. aquilegifolium* L., aggregate fruit, a) fruitlet; 4—*T. contortum* L., fruitlet; 5—*T. petaloideum* L., flower, a) fruitlet; 6—*T. isopyroides* C.A.M., part of stem with fruit; 7—*T. baicalense* Turcz., fruit and stamen; 8—*T. sultanabadense* Stapf.

- 523 13. *T. isopyroides* C. A. M. in Ldb., Fl. Alt. II (1830) 346; Ldb., Fl. Ross. I, 7; Boiss., Fl. Or. I, 6; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 1 (1861) 29; Lecoyer in Bull. Soc. Bot. Belg. XXXIV (1885) 196; Kryl., Fl. Zap. Sib. V, 1214. — Ic.: Ldb., Ic. pl. Fl. Ross. IV, tab. 397.

Perennial; stem 15–40 (50) cm high, simple, rarely branched, glabrous and smooth, as is the entire plant; leaves exstipulate, glaucous-green, 3–4-pinnate, few (usually 2 or 3), crowded in lower part of stem, petiolate or subsessile, the blade broadly triangular or triangular in outline; leaflets small, smooth, ovate-lanceolate, dissected almost to base into 2–3 obtusely pointed entire lobes, 3–8 mm long, 0.75–3.5 mm broad; inflorescence sparse, diffuse, the long (1.5 cm) slender pedicels almost horizontal, elongating and becoming indurated; in the fruit, sometimes to 10 cm; perianth segments 4, 1–3 mm long, (0.5) 1–1.5 mm broad, oval, subobtusely or subobtusely pointed; stamens 5–8, greenish brown, 4–6 mm long; filaments undilated; anthers linear, subacute, 1–2 mm long; pistils usually 3, rarely 2 or 4–6, one-third to half the length of the stamens; ovary 1 mm long, sessile; style 0.5 mm long; fruitlets sessile, oblong-ovoid, 3.5–5 mm long, 1.5 mm broad, distinctly and obtusely ribbed (ribs 3 on each side, not counting the median ribs), beak very slightly curved, ca. 0.75 mm long. May. (Plate XXXV, Figure 6).

Rocks and gravelly taluses in the lower mountain zone. — Caucasus: S. and E. Transc.; W. Siberia: Irt., Alt. (S.); Centr. Asia: Mtn. Turkm., Pam.-Al., T. Sh., Dzu.-Tarb. Gen. distr.: Iran., Arm.-Kurd., E. Med., Ind.-Him. Described from S. Altai. Type in Leningrad.

14. *T. squarrosus* Steph. ex Willd., Sp. pl. II (1799); DC., Syst. I, 177; Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 198; Kom., Fl. Manchzh. II, 1, 309. — *T. trigynum* Fisch. et DC., Prodr. I (1824) 14; Ldb., Fl. Ross. I, 11; Turcz., Fl. baic.-dah. I, 35; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 1 (1861) 30. — *T. trispermum* Fisch. ex Steud., Nomencl. Bot. (1841) 677. — *T. oligospermum* Fisch. ex Sweet, Hort. brit. (1827) 2. — Ic.: Rgl., l. c., tab. III, fig. 4.

524 Perennial, quite glabrous, rarely slightly glandular, 30–80 (100) cm high; root fibers grayish; leaves stipulate, crowded in middle part of stem, petiolate, 3–4-pinnatipartite, with narrow oblong segments; leaflets smooth, grayish green and dull, ovate, entire or obtusely 2–3-lobate at the apex and then obovate or broad-obovate, 3–10 mm long, 4–7 mm broad, rarely to 20 mm long and 10–12 mm broad; flowers in a very diffuse paniculate inflorescence, with long pedicels arising in groups of 2–3 (fruiting pedicels 3.5–6 cm long); flowers small, the perianth segments 3–5 mm long, 1–2 mm broad, elliptic, reddish or green; stamens 5–10; filaments slender, 3–5 mm; anthers 1–3 mm long, linear acuminate; pistils 1–3; ovary sessile, 2 mm long; style 1 mm long; fruitlets sessile, straight or slightly curved, oblong-obovoid, asymmetric (the ventral surface curved), slightly flattened, with numerous prominent ribs, tapering to base, 5–7 mm long, 2 mm broad; beak very slightly curved, 1.5 mm long. June–July.

Dry stony slopes and rock fissures. — E. Siberia: Dau.; Far East: Ze.-Bu. Gen. distr.: Mong. Described from Siberia. Type in Berlin.

15. *T. minus* L., Sp. pl. (1753) 546; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, I (1861) 31 p. p.; Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 199; Shmal'g., Fl. I, 5; Kom., Fl. Manchzh. II, 309; Kryl., Fl. Zap. Sib. V, 1215; Kom., Fl. Kamch. II, 155. — *T. elatum* et *T. majus* auct. fl. ross. — *T. mucronatum* Ldb., Fl. Ross. I (1842) 8. — *T. sibiricum* Ldb., l. c., 11. — *T. flavovirens* Ldb., l. c., 13. — *T. appendiculatum* C. A. M. in Ldb., Fl. Alt. II (1830) 356. — *T. kemense* Fries, Fl. Hall. (1817) 94; Hultén, Fl. Kamtch. II, 134. — *T. kamtschaticum* Nylander, Spicil. plant. Fenn. Cent. II (1846) 9. — *T. adiantifolium* Besser ex Eichw., Naturh. Skizze (1830) 182. — *T. micropodium* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 370. — *T. agreste* Kar. et Kir. l. c., p. 371. — *T. globiflorum* Ldb., Fl. Ross. I (1842) 9. — *T. ledebourianum* C. A. M. ex Rgl., l. c., p. 44. — *T. sibiricum* L., Sp. pl. (1753) 546, p. p. — *T. viperinum* Andr. in Nouv. mém. Soc. Nat. Mosc. (1832) 336. — *T. chinense* Freyn in OBZ (1901) 376. — Ic.; Rchb., Fl. Germ. fig. 4627–4630, 4632–4634; Kom. and Alis., Oprod. rast. Dal'nevost. kr., pl. 170. — Exs.: Fries, Herb. norm. No. 23–26.

Perennial, usually glabrous and smooth; stem 30–120 (150) cm high, erect, sometimes geniculate, with evenly spaced spreading leaves; root fibers gray; leaves exstipulate, rarely stipulate, petiolate (only upper leaves sessile), 3–4-pinnate, broadly triangular in general outline, 7–30 cm long and as broad; in the steppe and forest-steppe race (*T. collinum* Wallr., Sched. crit. d. Plant. Fl. Hal. (1822) 259), leaflets coriaceous suborbicular, rounded-ovate, or rounded-obovate [in outline], basally rounded, distally obtusely tridentate or trilobate, with 2–3-dentate lobes, small, to 1.5 cm long and as broad, with a network of very prominent veins beneath, margins very slightly convolute; in the meadow-forest Siberian variety (*T. sibiricum* L. p. p.; *T. kemense* Fries) leaflets coriaceous, larger — averaging ca. 2.5–3 cm long and ca. 2 cm broad, sometimes more than 4 cm long and as broad — rounded-obovate or obovate, basally rounded, distally usually coarsely tridentate, green, but slightly duller beneath and with a rather inconspicuous network of veins; the variety growing in the forest part of the Ural area and East Siberia (*T. globiflorum* Ldb.) leaflets very thin, delicate, membranous, obovate or ovate, rounded-cuneate, distally coarsely trilobate or tridentate, green above, glaucous with inconspicuous network of veins beneath, 2–3.5 cm long, 1.2–2 cm broad; in several varieties (*T. ledebourianum* C. A. M.) smallish leaflets distinctly cuneate; flowers usually nutant, in an oval or pyramidal many-flowered panicle, greenish-reddish; pedicels 5–10 (20) mm; perianth segments 3–4 mm long, 1.5–2 mm broad, ovate; stamens 10–15, pendent, 7–8 mm long, with slender filaments; anthers linear, obtuse or subacute; pistils 5–8; ovary 1 mm long, sessile; fruitlets 2.5–4 mm long, 1–2 mm broad, sessile, ovoid or ovoid-ellipsoid, distinctly oblong-ribbed, beak straight, ca. 0.75–1 mm long. June–July.

Steppe meadows, meadow steppe zone, shrub thickets, forest margins, and forest meadows. — European part: all regions; Caucasus: all regions; Centr. Asia: all mountainous regions; W. and E. Siberia; Far East. Gen. distr.: Europe (except N. Scand.), Bal.-As. Min., Arm.-Kurd., Iran., Ind.-Him., Mong., Dzu.-Kash., Jap.-Ch., N. Am. Described from N. Europe. Type in London.

Note. A collective species composed of many independent ecological and morphological variants, which, however, are not clearly distinguished and do not represent distinct taxonomic entities. In the USSR there occur three rather clearly separated types: *T. collinum* Wallr. (European part of the USSR, southern part of W. Siberia, Central Asia (N.), Caucasus), *T. sibiricum* L. p. p. (E. Lapland, NE of the European part, Siberia, Altai), and *T. globiflorum* Ldb. (Urals, NE of the European part, E. Siberia). True *T. minus* L., sensu strictu, is native only to the coast of southern Scandinavia; it is distinguished by its very small growth characteristically arcuately spreading leaves with small leaflets and few large achenes.

16. *T. podolicum* Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 173. — Ic.: Lecoyer, l. c., tab. IV, fig. 2.

Perennial; stem 50—70 cm high, simple, glabrous, sulcate; leaves stipulate (at insertion of petiole), petiolate or subsessile, 2—3-pinnate; leaflets small, 10—15 mm long, 2—7 mm broad, oblong, elliptic, or obovate, rounded or cuneate, distally 3—5-dentate with cuspidate or subobtuse teeth; rarely the leaflets entire; rufous veins prominent beneath, covered with aciculate hairs; inflorescence pyramidal, divaricate, few-flowered; pedicels 5—10 mm with linear bracteoles; flowers small, greenish; perianth segments 4, ovate, 2 mm long, 0.5—0.75 mm broad, dentate; stamens 10—15, the filaments yellowish, 2—4 mm long, distally dilated, thicker than anthers; anthers 1—1.5 mm long, elliptic, obtuse; pistils 4—7; ovary sessile, 1 mm long; style terminal, 1 mm long; fruitlets sessile, 2—3 mm long, 1 mm broad, subfusiform, oblong-ribbed, straight or slightly concave along dorsal line, convex along ventral line, with a persistent beak. June—July.

European part: M. Dnp. Endemic. Described from Podolia. Type in Berlin.

Note. A very enigmatic species, discovered by Hochstetter, who failed to report the exact locality and conditions of growth, and believed by Pachovskii to be endemic to Podolia. Specimens in the Berlin Botanical Gardens.

17. *T. simplex* L., Mant. I (1767) 78; Ldb., Fl. Ross. I, 10; Turcz., Fl. baic.-dah. I, 32; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 1 (1861) 50; Lecoyer in Bull. Soc. Bot. Belg. XXIX (1885) 204; Boiss., Fl. Or. I, 8; Shmal'g., Fl. I, 6; Kom., Fl. Manchzh. II, 1, 312; Kryl., Fl. Zap. Sib. V, 1217. — *T. angustifolium* L., Sp. pl. (1753) 546, p. p. — *T. exaltatum* C. A. M. in Ldb., Fl. Alt. II (1830) 352. — *T. auriculatum* Besser ex Eichw., Naturh. Skizze v. Lith. (1830) 182. — *T. affine*, *T. strictum* et *T. simplex* Ldb., Fl. Ross. I (1842) 10. — *T. confertiflorum* Fisch. et Mey. ex Lecoyer, l. c., 261. — *T. pauciflorum* Steph. ex Lecoyer, l. c., p. 302 (nomen). — *T. heterophyllum* Turcz., l. c., p. 33. — Ic.: Ldb., Ic. pl. Fl. Ross. t. 158; Fl. Dan. t. 244; Kom. and Alis', Opred. rast. Dal'nevost. kr., 169. — Exs.: HFR No. 1152.

Perennial; stem simple, erect, 60—100 (120) cm high, glabrous — as is the entire plant — with more or less appressed leaves (rarely lower leaves spreading); leaves petiolate with petioles 2—7 cm long, or the upper leaves sessile, lower leaves larger, oblong-triangular or oblong in outline, bipinnate, their lateral primary lobes much shorter than the middle lobe;

leaflets 1–4 cm long, 0.5–2 cm broad; sessile or subsessile, cuneate-oblong or oblong-obovate or (in upper leaves) linear-lanceolate, cuneate or rounded, apically trilobate or coarsely tridentate or else entire; inflorescence narrow, oblong, 10–50 cm long, 4–13 cm broad, more or less flattened; flowers small, purple; pedicels 3–10 (12) mm; perianth segments 4, greenish or purple, oval, 2–4 mm long; stamens 11–15, pendent, with slender filaments; anthers 2–3 mm long, produced into a small sharp point; pistils 6–12; ovary sessile, 1 mm long; fruitlets sessile, 2–2.5 mm long, 0.75–1 mm broad, glabrous, ovoid or oblong-ovoid, convex laterally, with 6 longitudinal ribs, produced into a persistent, proximally sagittate stigma. June–July.

Shrub thickets, forest margins, young birch outliers. — European part: all regions; Caucasus; Siberia (except the Arctic part); Far East: Ze.-Bu., Uss.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. Gen. distr.: Europe, Bal.-As. Min., Dzu.-Kash., Mong., Jap.-Ch. Described from Europe. Type in London.

18. *T. flavum* L., Sp. pl. (1753) 546; Ldb., Fl. Ross. I, 12; Turcz., Fl. baic.-dah. I, 34; Rgl., in Bull. Soc. Nat. Mosc. XXXIV, 1 (1861) 60; Boiss., Fl. Or. I, 9; Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 208; Shmal'g., Fl. I, 6; Kom., Fl. Manchzh. II, 1, 313; Kryl., Fl. Zap. Sib. V, 1218. — *T. nigricans* Jacq., Fl. Austr. V (1778) t. 421. — *T. commutatum* C. A. M. in Ldb., Fl. Alt. II (1830) 356; Turcz., Fl. baic.-dah. I, 33. — *T. rufinerve* Lej. et Court., Comp. Fl. Belg. II (1831) 207; Ldb., Fl. Ross. I, 12. — *T. glaucovirens* Andrz. ex Lecoyer, l. c., p. 277, nomen. — *T. amurense* Maxim., Prim. Fl. Amur. (1859) 15, p. p. — Ic.: Rchb., Ic. Fl. Germ. tab. 46, f. 4639; Lecoyer, l. c., tab. V, Fig. 7. — Exs.: Fl. exs. austr.-hung. No. 2554.

Perennial; root fibers yellowish; stem tall, 60–150 (200) cm, erect, sulcate, glabrous; leaves spreading evenly spaced along stem, the lower leaves stipulate (at insertion of petiole), rarely exstipulate petiolate, tripinnate, triangular in general outline, 10–20 cm long, 7–15 cm broad; leaflets largish, 2–5 cm long, 1–3 cm broad, obovate, petiolate or sessile, rounded-cuneate, distally trilobate or tridentate, the lobes acuminate or obtuse, usually entire, dull above, paler beneath; leaflets of upper leaves narrower; flowers with short (2–10 mm) pedicels, crowded in small groups at the tips of branches of the inflorescence, forming a rather compact, usually small, and often subcorymbose panicle; perianth segments (4), whitish, ovate, 2.5–4.5 mm long, 1–2 mm broad; stamens 12–20, yellow, erect, the filaments slender, 2–4 mm long, the anthers 1.5–2 mm long, linear, obtuse or subobtuse; pistils 7–15; ovary 1 mm long, sessile; style 0.5–0.75 mm long; fruitlets sessile, 2–3.5 mm long, 1–1.5 mm broad, ovoid, with 6 lateral ribs and with an almost straight beak, ca. 1 mm long. June–July.

Shrub thickets on banks of rivers and streams, deciduous riparian forest strips, and boggy meadows with shrubs. — Arctic: Arc. Eur.; European part: all regions; Caucasus: Cisc., W. and E. Transc.; W. Siberia: all regions; E. Siberia: Ang.-Say., Lena-Kol.; Far East: Ze.-Bu., Uss.; Centr. Asia: Dzu.-Tarb. Gen. distr.: Europe (except the southernmost part). Described from N. Europe. Type in London.

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19. *T. angustifolium* L., Sp. pl. ed. 1 (1753) 541 p. p.; Jacq., Hort. Vind. III (1778) 25, tab. 43 (excl. syn.); Ldb., Fl. Ross. I (1842) 12; Rgl. in Bull. Soc. Nat. Mosc. XXXIV (1861) 59; Lecoyer in Bull. Soc. Bot. Belg. XXIV (1885) 206; Shmal'g., Fl. I (1895) 6. — *T. divergens* Link, Enum. Hort. Berol. II (1833) 92, p. p. — *T. microcarpum* Loudon, An Encyc. of Plants (1829) 647. — *T. nigricans* DC., Syst. I (1818) 182 (excl. syn.). — Ic.: Rchb., Ic. Fl. Germ. t. XL, XLI (4634 et 4637); Lecoyer, l. c., tab. 5, fig. 6. — Exs.: HFR No. 1352; Fl. polon. exs. No. 702.

Perennial; rootstock not creeping, the roots yellowish; stem 50–150 cm high, erect, usually simple; leaves 2–3-pinnate, sessile or short-petioled; leaflets linear or oblong, 10–50 mm long, 1–10 mm broad, sessile, rarely petiolate, cuneate, entire, rarely trilobate or tridentate, with convolute margins, the upper surface glabrous, darker, lustrous, the lower surface glaucescent-green, usually with a slight short pubescence or glandular; inflorescence dense, ovoid, oblong, or pyramidal, many-flowered; perianth segments 4, 2 mm long, 1 mm broad, ovate, pale yellow, as are the filaments; pedicels 1–5 mm long; stamens 10–15, the filaments not dilated, 2–4 mm long; anthers linear, 1 mm long, obtuse or subobtuse; pistils 10–15; ovary 0.5– mm long, sessile; style 0.25 mm long; fruitlets small, 1–2.5 mm long, 1–1.25 mm broad, sessile, ovoid, with longitudinal ribs, beak small, almost straight, 0.25 mm long. June–July.

Damp meadows with shrubs on peaty soil. — European part: Lad. -Ilm., U.V., U. Dnp., Kar. -Lap. (rare in S. part), Dv. -Pech. (rare in SW part), V. -Don, Bl., L. Don (N.), V. -Kama (W.). **Gen. distr.:** Scand. (S.), Centr. Eur., W. Med., Bal. -As. Min. Described from Germany. Type in London.

Genus 540. **ADONIS*** L.**

L., Gen. pl. (1737) 166. — *Chrysocyathus* Falconer in Royle III. I (1839) introd. XXV.

Flowers single, at tips of stems and branches; the outer perianth segments with 5–8, the inner with 5–24 lobes, without nectariferous glands; pistils numerous; receptacle oblong or cylindric; ovary with 1 ovule; achenes rugose, with a straight or recurved beak. Annual and perennial herbs with simple or branched stems and pinnately or palmately repeatedly divided leaves with narrow lobes.

- 1. Perennials; fruitlets almost always pubescent 2.
- + Annuals; fruitlets glabrous 9.
- 2. Lower cauline leaves long-petioled 3.
- + All leaves sessile 4.
- 3. Fruitlets pubescent 5. *A. amurensis* Rgl. et Radde
- + Fruitlets glabrous, with involute beak 6. *A. chrysocyathus* Hook. f. et Th.
- 4. Leaves pinnatisect 5.
- + Leaves palmatisect 8.

* From the name of Adonis, who, according to legend, was transformed into a bloodred flower.
 ** Treatment by E.G. Bobrov.

5. Stems, leaves, and sepals glabrous; flowers 4–6 cm in diameter . . . *A. sibiricus* Patr.
- + Entire upper part of plant more or less pubescent 6.
6. Stems and leaves densely hairy, especially when young; sepals acuminate; fruitlets slightly rugulose 2. *A. villosus* Ldb.
- + Entire upper part of plant unevenly and remotely covered with crisp hairs; sepals oval; fruitlets distinctly rugulose 7.
7. Plant spreading; stems and branches sometimes almost prostrate; leaf lobes lanceolate; flowers 3.5–5 cm in diameter 3. *A. tianschanicus* (Adolf) Lipschitz.
- + Plant not spreading, branches slightly spreading; leaf lobes lanceolate-linear; flowers 4–6 cm in diameter 4. *A. turkestanicus* (Korsh.) Adolf.
8. Leaf lobes linear, glabrous; beak of fruitlets hamately recurved 7. *A. vernalis* L.
- + Leaf lobes linear-lanceolate, pubescent; beak of fruitlets reflexed, appressed 8. *A. wolgensis* Stev.
9. Sepals always glabrous, divergent from petals or even recurved; fruitlets with 1 proximal tooth 11. *A. autumnalis* L.
- + Sepals pubescent or glabrous, appressed to petals 10.
10. Sepals glabrous, rarely hairy beneath; fruitlets with 2 or 3 teeth; beak not turning dark 9. *A. aestivalis* L.
- + Sepals always hairy; fruitlets with one tooth at upper margin; beak turning black distally 10. *A. flammeus* Jacq.

Section 1. **CONSILIGO** DC., Syst. Nat. I (1818) 224. — Perennial rhizomatous plants; flowers large; petals 8–24; stamens up to 30; aggregate fruit globose-ovoid; fruitlets pubescent, rarely glabrous, with bent or recurved beak (style).

Economic importance. Species of this section contain considerable amounts of adonidin and have wide application in treatment of heart diseases. Though only *A. vernalis* is officially the accepted in the pharmacopeia, there are grounds for supposing that other species have very similar effects. In popular medicine the green parts, as well as the rootstock of *Adonis*, are used against many illnesses; the latter is also used as the source of a yellow dye. Annual species (section *Adonia*), as well as perennial species, are poisonous and are avoided by livestock.

530 Series 1. **Apennini** Bobr. — Leaves sessile, pinnatisect. Plants of open woods, forest margins, mountain steppes, and the subalpine zone.

1. *A. sibiricus* Patr. ex Ldb., Suppl. II Ind. Sem. Horti Dorpat. 1824; Kryl., Fl. Zap. Sib. V, 1223. — *A. apennina* Turcz., Fl. Baic.-dah. I, 44, non L. — *A. vernalis* γ *sibirica* DC., Syst. I (1818) 225; Prodr. I (1824) 25. — *A. ircutiana* Fisch. ex DC., Prodr. l.c. — *A. apennina* var. *sibirica* Ldb., Fl. Alt. I (1829) 341; Fl. Ross. I, 25. — *A. dahurica* Ldb. ex Rchb., Icon. Fl. Germ. tab. 321; Turcz., Fl. baic.-dah. I, 45. — *A. apennina* var. *Dahurica* Ldb., Fl. Ross. l.c. — *A. apennina* subsp. *sibirica* Korsh., Fl. Vost. Evr. Ross. (1892) 77. — Ic.: Rchb., Icon. bot. IV (1826) 322. — Vernacular name: starodubka.

Perennial; root stock, stout, short; stems at beginning of flowering 20–30 cm, subsequently to 60 cm high, smooth, simple or with short slightly spreading branches; radical and lower cauline leaves squamiform, the cauline leaves sessile, large, 2–3-pinnatipartite, oval or triangular in outline, the lobes lanceolate, sometimes dentate, to 10 mm long, 1.5 mm broad, glabrous; flowers large, 4–6 cm in diameter, intensely yellow (somewhat paler when dry); sepals yellowish-greenish, glabrous, orbicular or rounded-ovate, tapering distally, 10–15 mm long, 8–10 mm broad; petals obovate or orbicular, overlapping, 20–30 mm long, 10–15 mm broad; fruitlets remotely short-pubescent, ca. 4.5 mm long, 4 mm broad, with a short recurved style. Fl. end of May and in June, fr. June – July.

Forest margins, open forests, rarely dry-valley meadows adjacent to forests. — European part: in the east. — Dv. -Pech. and V. -Kama (Urals); W. Siberia: U. Tob., Ob (south of Tobol'sk), Irt., Alt.; E. Siberia: Yenisei (extreme south), Lena-Kol. (in the north—vicinity of Yakutsk), Ang. -Say., Dau. (in the east—Nerchinskii Zavod); Centr. Asia: Dzu. -Tarb. (Tarbagatai). Gen. distr.: Mong. Described from Altai.

Note. *A. dahurica*, first described by Ledebour and subsequently accepted by Turchaninov, is distinguished by narrower petals. It seems to be the only species native to the dry open habitats of Transbaikalia.

2. *A. villosus* Ldb., Suppl. II Ind. sem. H. Dorp. (1824) sine pag.; Ldb., Fl. Alt. II (1830) 340; Ldb., Fl. Ross. I, 25; Kryl., Fl. Alt. I (1908) 17. — *A. wolgensis* var. *villosa* Trautv., Bull. Soc. Nat. Mosc. XXXIII, 1 (1860) 63; Rgl. in Bull. Soc. Nat. Mosq. XXXIV (1861) 35; Kryl., Fl. Zap. Sib. V, 1222, p. p. — *A. chaerophylla* Fisch. in sched. — Ic.: Ldb., Ic. pl. Fl. Ross., tab. 119.

531 Perennial; rootstock short, brownish; stems usually solitary, densely hairy, 5–15 cm at beginning of flowering, subsequently to 30 cm high, with remote hairs, with spreading branches, the stems covered proximally with squamiform brownish leaves; cauline leaves oval in outline, bipinnate, their lobes broad-lanceolate or elliptic, acuminate; young leaves densely hairy, especially beneath; flowers 2–4 (5) cm in diameter; calyx lobes lilac, elliptic, acuminate, pubescent, scarcely half the length of the petals; petals oblong, narrow, somewhat tapering distally, entire or slightly dentate, pale yellow, 1–1.5 cm long, 0.5–1 cm broad; fruiting heads on hairy peduncle, globose or ovoid, often nutant; fruitlets 3–4 mm long, oval, hairy, inconspicuously rugulose, with a hamately recurved beak (style). Fl. May – June, fr. June.

Mountain steppes, rarely at the edges of birch outliers. — W. Siberia: Alt. (SW — Barnaul, Kulunda, Zmeinogorsk, Kuznetsk, Riddersk, Loktevsk); Centr. Asia: Balkh. (E. — Kokbekty, between Semipalatinsk and Ayaguz). Gen. distr.: possibly occurring in the Mongolian Altai. Described from Riddersk. Type in Leningrad.

3. *A. tianschanicus* (Adolf) Lipschitz, comb. nova. — *A. turkestanica* var. *tianschanica* Adolf in Bull. of Appl. Bot. 23 (1930) 328. — *A. vernalis* pinnatifida Rgl. et Herd., Bull. Soc. Nat. Mosq. XXXVII (1864) 394. —

Perennial; rootstock dark grayish brown, vertical; stems 3–5 or stem branched from base, thus the entire plant appearing many-stemmed, the lateral stems (or branches) spreading or almost prostrate, young stems ca. 10 cm high, densely crisp-hairy, subsequently to 40 cm high, with scattered hairs or glabrate, with squamiform leaves at very base of stems; cauline leaves oblong-oval in outline, bipinnatifid with lanceolate lobes, entire or incised, the young leaves densely crisp-hairy, the old leaves remotely hairy; flowers 3–5 per plant, pale yellow, 3.5–5 cm in diameter; sepals oval, scarcely half the length of the petals, hairy proximally; petals lanceolate, 3–8 mm broad, 1.5–2.5 cm long, irregularly dentate; fruiting heads nutant; fruitlets 3–4 mm long, distinctly rugulose, remotely hairy, with a small hamately recurved beak. Fl. May, fr. June.

Mountain steppes. — Centr. Asia: T. Sh. (central part). Gen. distr.: Chinese Tien Shan (?). Described from the Dzharkent [Panfilov] District. Type in Leningrad.

Note. Very closely related to the neighboring species; it is distinguished from *A. villosus* by its diffusely branched, sometimes almost prostrate stems, which are not solitary, and by the distinctly rugose achenes; moreover, the entire plant is less densely hairy and has a more xerophilous aspect; it is distinguished from *A. turkestanicus* by the spreading stems, the more dissected leaves with lanceolate lobes, and the smaller flowers.

- 532 4. *A. turkestanicus* (Korsh.) Adolf in Bull. of Appl. Bot. 23, I (1930) 327. — *A. apennina* var. *turkestanica* Korsh. in Bull. de l'Acad. St. Pétersb. IX (1898) 400.

Perennial; rootstock long, vertical; stems hairy, 10–20 cm high at beginning of flowering, subsequently to 60 cm high, glabrate or irregularly and remotely crisp-hairy, with slightly spreading branches; the lower part of stem covered with grayish brown entire scales; middle cauline leaves oval in outline, dissected into lanceolate, sometimes almost lance-linear acuminate lobes, irregularly arachnoid along the veins beneath — mainly in lower part of stem in specimens growing in rather xerophytic habitats, flowers 4–6 cm in diameter, intensely yellow, turning paler or slightly bluish on drying; sepals half the length of the petals, with a short pubescence beneath; petals 2–3 cm long, 8–12 mm broad, sometimes unequally dentate; fruit stalk covered with leaves almost to the apex; aggregate fruit globose; fruitlets ca. 4 mm long, 3 mm broad, distinctly rugulose, short-pubescent, with a short hamately recurved beak. Fl. May — June, fr. June — July. (Plate XXXVI, Figure 4, a).

Abundant in mesophilic habitats in the subalpine zone. — Centr. Asia: Pam. — Al. Gen. distr.: Kuldja. Described from Darvaz (Tal'bar). Type in Leningrad.

Series 2. *Petiolati* Bobr. — Leaves long-petioled, pinnatisect.

5. *A. amurensis* Rgl. in Bull. Soc. Nat. Mosc. XXXIII, 1 (1861) 35; Kom., Fl. Mansh. II, 315. — *A. apennina* var. *dahurica* Maxim., Prim. Fl. Amur. (1859) 19, non Ldb. — *A. Barthei* Franch., Les Adonis



PLATE XXXVI. 1—*Adonis chrysocyathus* Hook. f. et Th., 1a) fruitlet; 2—*A. vernalis* L., part of leaf, 2a) fruitlet; 3—*A. wolgensis* Stev., part of leaf, 3a) fruitlet; 4—*A. turkestanicus* (Korsh.) Adolf, 4a) fruitlet.

viv. (1894) 9.—Ic.: Rgl., l. c., tab. II; Kom. and Alis., Opred. rast. Dal'nevost. kr. I (1931) tab. 171, 172.—Exs.: HFR No. 1903.

Perennial; rootstock short, stout; stems 5–15 cm at beginning of flowering, subsequently to 30–40 cm high, simple or slightly branched proximally, aphyllous proximally and covered with scarious light brown scales to 2.5 cm long, the upper scales sometimes bearing blades of small leaflets; middle cauline leaves fully developed after flowering, with long branching petioles, pinnatisect, with lanceolate dentate slightly pubescent or glabrate lobes; sepals glabrous or slightly pubescent, pale lilac, as long as or slightly longer than petals; petals yellow, oblong-elliptic, obtuse, 12–23 mm long, 3–8 mm broad; fruitlets pubescent, 4–5 mm long, 3–3.5 mm broad, with an appressed hamately curved beak. Fl. March–April, fr. May.

Damp rich humous soil in shrub thickets and forest margins.— Far East: Ze. -Bu., Uda, Uss., Sakh. Gen. distr.: Manchuria, Korea, N. Japan. Described from the lower Amur (Kulgu and Keurmi).* Type in Leningrad.

6. *A. chrysocyathus* Hook. f. et Th. in Hook., Fl. Brit. Ind. I (1875) 15.—*A. pyrenaica* Hook. f. et Th., Fl. Ind. I (1855) 26, non DC.—*A. margaritae* A. Butkov in Bull. Univers. As. Centr. 19 (1934) 117.—Ic.: Coventry, Wild Flowers of Kashmir I (1923) 9, tab. V.

Perennial; rootstock long, vertical; stems 12–40 cm high (elongating after flowering), usually erect, sometimes inclined distally, simple, with leaves in upper part, proximally reddish brown with squamiform leaves; lower cauline leaves (2–5), their long petioles 2–3 times as long as the blade, sometimes almost reaching the level of the stem tip; upper cauline leaves sessile; leaf blade tripinnatifid, the lobes oval-rhombic or sub lanceolate, cuneate, acuminate; young leaflets remotely crisp-hairy beneath; flowers single, borne on a short pubescent peduncle; outer perianth segments (6–8) lilac, oval, hairy on the outside, unequally dentate apically, 12–15 mm long; inner perianth segments (16–24) golden yellow, 25–27 mm long, 5–8 mm broad, oblanceolate, obtuse; fruiting head globose, ca. 10 mm in diameter; fruitlets 5–7 mm long, glabrous, with a long involute beak. Fl. May–June, fr. August. (Plate XXXVI, Figure 1, a).

Areas with sparse soil in the alpine zone, grass plots, and patches of snow.—Centr. Asia: T. Sh. (Frunze and Naryn districts). Gen. distr.: Kashmir, W. Tibet. Described from Kashmir.

Note. This species is included in the series *Petiolati* merely on the basis of a formal character — i.e., lower leaves long-petioled — and it is only very tentatively brought into relation with *A. amurensis*. Both species show distinct connections with several Tibetan-Chinese species which have not yet been accurately studied: they probably belong to different series.

Series 3. **Vernales** Bobr. — Leaves sessile, palmatisect. Plants of lowland steppe and forest-steppe.

* Mainly on the basis of the rich collections of Radde from the Bureya Mountains.— V.K.

7. *A. vernalis* L., Sp. pl. (1753) 547; Ldb., Fl. Ross. I, 24; Shmal'g., Fl. I, 11; Kryl., Fl. Zap. Sib. V, 1220.—Ic.: Rchb., Ic. Fl. Germ. III, tab. 24.—Exs.: HFR No. 701; Fl. Cauc. exs. No. 358; Herb. Fl. Cauc. No. 357.

536 Perennial; rootstock short, stout, brownish black; stems 3 or 4, 5–20 cm at beginning of flowering, elongating to 40 cm after flowering, smooth, erect or slightly spreading, usually with few appressed branches, proximally brownish, covered with grayish brown leaf scales; cauline leaves sessile, oval in outline, dissected into lobes, the lower ones palmatipartite, the upper bipalmately parted, with linear, entire, 1–2 cm long, 0.5–1 mm broad, lobes, rigidulous after flowering; flowers yellow, 4–5.5 cm in diameter; sepals ovate, obtuse, greenish, finely pubescent, 12–20 mm long, 12 mm broad; petals 12–20, oblong-elliptic, distally somewhat tapering and unequally crenulate, 15–34 mm long, 5–12 mm broad, fruiting heads oval, ca. 20 mm long, 12 mm broad; fruitlets oval, 3.5–5.5 mm long, 3 mm broad, rugose, hairy, with a short hamately revolute beak. Fl. April, fr. May. (Plate XXXVI, Figure 2a).

Edges of forest outliers and steppes in the forest-steppe zone.—European part: U. V. (Plavsk, Moscow Region), U. Dnp. (S.), V. -Don (Elets—Ranenburg—Sviyazhek—Sergach, in the north), V. -Kama (SE of the line Kazan—Kungur), Transv., M. Dnp., Bl., Crim., L. Don; Caucasus: Cisc.; W. Siberia: U. Tob. (south to Orsk), Ob (in the south—Tyumen, Tara, Tomsk, Achinsk), Irt. (in the north—Petropavlovsk, Omsk, Kainsk), Alt. (N.); E. Siberia: Ang.-Say. (Krasnoyarsk, Minusinsk), Lena-Kol. (on the Lena, 130 km below Olekminsk, near Chekurskaya). Gen. distr.: Alt., Centr., and S. Europe. Described from Germany. Type in London.

8. *A. wolgensis* Stev. in DC., Syst. I (1818) 245; Ldb., Fl. Ross. I, 24; Shmal'g., Fl. I, 12.—*A. marschalliana* Andr. ex Besser, Enumer. pl. (1822) 22 No. 673.—Exs.: HFR No. 651.

Perennial; rootstock short, stout, brownish black; stems few, 15–30 cm high, diffusely branched from the middle, brownish proximally with brownish squamiform leaves; young leaves and stems densely pubescent, becoming remotely hairy after flowering; leaves strongly dissected into lobes, their lobules broader than in *A. vernalis*, revolute-margined; flowers pale yellow, 3.5–4.5 cm in diameter; sepals more than half the length of the petals, slightly pubescent, lilac; petals 17–22 mm long, 6–7 mm broad; aggregate fruit globose, the achenes obscurely rugulose or nearly smooth, hairy, ca. 4 mm long, the beak recurved, more or less tightly appressed to the achene. Fl. end of April, fr. May. (Plate XXXVI, Figure 3, a).

537 Steppes, especially in the subzone of dry steppes, rarely in forest grass plots and forest margins.—European part: M. Dnp., V. -Don (S.), Transv. (except N.), Bl., Crim., L. Don, L. V.; Caucasus: Tal.; W. Siberia: U. Tob., Irt., Centr. Asia: Ar.-Casp. (extreme north). Gen. distr.: Hungary, Arm.-Kurd. (Kagyzman). Described from the Lower Volga. Type in Helsinki.

Note. A hybrid between this and the preceding species is described from Transylvania; it is highly probable that [such] hybrids also occur in the USSR.

Section 2. *ADONIA* DC., Syst. I (1818) 221. — *Adonis annua* Mill. ex Trautv. in A. H. P. VIII (1883) 37. — Annuals with fusiform few-branched roots; flowers 1.5–3.5 cm in diameter; petals 5–10; stamens up to 20; fruitlets fruitlets glabrous with an erect beak (style).

Economic importance. This section comprises innocuous weeds. *A. aestivalis* yields the glucoside adonin but the adonin obtained from the perennial species is 200 times more effective.

9. *A. aestivalis* L., Sp. pl. ed. II (1762) 771; Ldb., Fl. Ross. I, 23; Shmal'g., Fl. I, 11. — *A. miniata* Jacq., Fl. Austr. IV (1776) 29; Trautv. in A. H. P. VIII (1883) 37. — *A. micrantha* DC., ex Trautv., l. c. — *A. squarrosa* Stev. in Bull. Soc. Nat. Mosq. II (1848) 272; Trautv. l. c. — *A. parviflora* Fisch. in DC., Prodr. I (1824) 24; Grossg., Fl. Kavk. II (1930) 123. — *A. aestivalis* var. *parviflora* M. B., Fl. taur.-cauc. III (1819) 378; Ldb., Fl. Ross. I, 23; Kryl., Fl. Zap. Sib. V, 1220. — *A. aestivalis* ssp. *parviflora* N. Busch, Fl. Cauc. crit. III, 3 (1903) 201. — Ic.: Jacq., l. c., tab. 354; Rchb., l. c. Fl. Germ. fig. 4619. — Exs.: H. F. A. M. No. 150, a, b; Fl. Boh. et Morav. No. 339.

Annual, 10–50 cm high; stem erect, simple or branched, sulcate, glabrous, rarely hairy proximally (var. *velutinus* Lipsky); leaves sessile, the lower leaves petiolate, ovate, 2–3-sect into linear lobes; flowers in upper part of stem, 13–30 cm [sic!] in diameter (in var. *parviflorus* (Fisch.) M. B. the flowers 13–15 cm [sic!]); sepals flat, ovate, glabrous, rarely hairy beneath (var. *velutinus* Lipsky); petals appressed to and almost twice as long as sepals, lanceolate or ovate, yellow to intense red, with black basal patches; fruitlets in a dense oblong head, rugose-alveolate, drawn out into a straight uniformly colored beak, with a more or less distinct pectinate-dentate border from above base, 1 subacute tooth below, 2 small teeth above. April–June.

A weed in fields, also occurring in solonchic meadows, in the shade of rocks and shrubs, and in mountains up to 2,000 m. — European part: M. Dnp. (SW), Bl., Crim., L. Don (S.), L. V. (S., and Khvalynsk in the north), Transv. (Orenburg); Caucasus: all regions; W. Siberia: southern parts of U. Tob., Irt., and Alt.; Centr. Asia: all regions except desert and high-mountain regions. Gen. distr.: Atl. and Centr. Eur., Med., Bal.-As. Min., Arm.-Kurd., Iran. Described from S. Europe. Type in the Linnaean Herbarium.

538 Note. Russian botanists have recently succeeded in separating *A. parviflorus*, reported from Lake Inder; it is distinguished from the type by small flowers, unbranched stem, and the inconspicuous upper tooth of the achene; all these characters are very indefinite, as they are usually characteristic not only for plants from the Caspian semidesert but also for specimens from semidesert and solonchic areas of the Crimea, Transcaucasia, and the Lake Balkhash area, i.e., it is not distinct geographically. There are equally good grounds for separating* pubescent plants of eastern Transcaucasia and Dagestan, but these are also known from the vicinity of Tbilisi and from the Crimea as var. *velutina* Lipsky, in Flora Kavkaza [Flora of the Caucasus] (1899) 205, 564.

* This has of late been done by A. Ya. Butkov, who described similar species from Turkmenia as *A. bienertii* Butk. Butkov reported that in collections made by Bogdanovich he has recognised *A. persicus* Boiss., a new species from the Atrek River, in southwest Turkmenia. Its most characteristic features are the very short fruitlets that scarcely reach a length of 1.75 mm, beak included.

10. *A. flammeus* Jacq., Fl. Austr. IV (1776) 29. — *A. caudata* Stev. in Bull. Soc. Nat. Mosq. III (1848) 273; Trautv. in A. H. P., VIII (1883) 37. — *A. dentata* Ldb., Fl. Ross. I, 24 (non Del.); Trautv. l. c. — Ic.: Jacq., l. c. tab. 355; Rchb., lc. Fl. Germ., 4620. — Exs.: Fl. Gall. et Germ., de Billot No. 2003.

Annual, 20–50 cm high; stem erect, simple or branched, sulcate, pubescent; leaves amplexicaul, 3–4-palmatisect with linear lobes, more or less hairy; flowers 2–4 cm in diameter, single; sepals appressed to petals, hairy on the outside, very rarely glabrate; petals 7–15 mm long, lanceolate or ovate, intense red, rarely yellow, black proximally; stamens dark violet; fruitlets in a cylindric more or less loose head, edentate dorsally, with a small obtuse distal tooth, drawn out into a terminally blackening beak. May – June.

Mainly a weed in crop fields. — European part: M. Dnp., Bl., Crim.; Caucasus: Cisc., W. Transc. (NW), E. Transc. (Tbilisi, Akhaltsikhe, Barzhomi, Ganzha), Tal. **Gen. distr.:** Centr. Eur., Med., Bal.-As. Min. Described from Austria.

11. *A. autumnalis* L., Sp. pl. ed. II (1762) 771; Ldb., Fl. Ross. I, 23; Shmal'g., Fl. I, 11. — Ic.: Hegi, Fl. III, tab. 717; Rchb., lc. Fl. Germ., fig. 4621. — Exs.: Fl. Gall. et Germ., de Billot No. 1102; Pl. Hercegov., A. Callier No. 4.

Annual, 25–40 (60) cm; stem erect, simple or slightly branched, sulcate, usually glabrous; the lower leaves petiolate, the upper sessile, all leaves palmatipartite, with linear entire or trifid lobes; flowers single, 15–25 cm in diameter; calyx lobes glabrous, divergent from base or even recurved; petals 6–10, ovate, entire, together forming a hemispheric corolla, intense red, almost black proximally; stamens dark violet; fruitlets in an oblong-ovoid subcylindric head, its axis bearing the traces of loosely set achenes; achenes pyriform, rugose, uniformly colored, with a straight edentate beak. June – July.

Parks and gardens; rarely penetrating crop fields. — European part: possible occurrence in M. Dnp. and Bl. **Gen. distr.:** Centr. Eur., Med. Described from S. Europe. Type in the Linnaean Herbarium.

Note. Most records of this species by new authors should be referred to *A. aestivalis*; there are no fully substantiated records of *A. autumnalis* for the western regions of the Ukraine.

Family LXIV. **BERBERIDACEAE** TORR. et GRAY*

Flowers at summit of stem or in terminal or lateral inflorescences, perfect, with 2- or 3-merous envelopes; usually perianth of 2 envelopes, which are not always clearly set off as calyx and corolla, and 2 whorls of the androecium; between the perianth and the stamens there are sometimes 2 whorls of nectaries; stamens distinct; anthers usually opening by valves; ovary one, with one carpel; ovules numerous, rarely few or even single, borne along ventral suture of ovary or at its base; albumen abundant; embryo straight, small.

* Treatment by B.A. Fedchenko.

Perennial herbaceous plants, rarely shrubs, sometimes reaching 5–6 m in height. Leaves sometimes only radical, usually alternate. Stipules often quite undeveloped, with sheaths or as spines at the base of leaves; leaves simple, ternate or pinnatisect.

Key to Genera

1. Shrubs with entire, often serrate-dentate leaves, with tripartite or simple spines or stipules at base of leaves 547. *Berberis* L.
- + Herbs 2.
2. Leaves bipartite or entire 3.
- + Leaves ternately or pinnately divided 4.
3. Flowers in a paniculate inflorescence; stems 2-leaved 542. *Diphylleia* L. C. Rich.
- + Flowers borne singly at tip of aphyllous peduncle; sepals 4, petals 8, stamens 8 541. *Jeffersonia* Barton.
4. Petals with spurs 543. *Epimedium* L.
- + Petals without spurs 5.
- 540 5. Plants with tubers; wall of ripe fruit strongly inflated, persistent, often opening at the apex 6.
- + Plants with horizontal rootstock; wall of ripe fruit dying, falling in fruit 546. *Caulophyllum* L. C. Rich.
6. Petals as large as or larger than sepals; leaves pinnatipartite 545. *Bongardia* C. A. Mey.
- + Petals much smaller than sepals; leaves ternate or almost pinnate 544. *Leontice* L.

Genus 541. *JEFFERSONIA* *BART.

Bart. in Trans. Amer. Phil. Soc. III (1793) 334.—*Plagiorhegma* Maxim. Prim. Fl. Amur. (1859) 34, tab. II.

Sepals 4, petaloid; petals 8, flat, somewhat larger than sepals; stamens 8, distinct; anthers opening by 2 apical valves; pistil one; style broadened distally into an almost bilobate stigma; ovules numerous, multiseriate, borne on the ventral suture; capsule coriaceous, opening by a subapical, horizontal or oblique aperture; seeds oblong or obovate, with a short aril; perennials with an underground rootstock; stem leafless, with a solitary terminal white flower; all leaves radical, venation palmate.

Note. This diagnosis of the *Jeffersonia* flower has been criticized by Hooker (Benth. et Hook. Gen. pl.), who considered the flower tetramerous, and by Prantl (Engl. and Prantl, Nat. Pflanznfam.), who speaks of 3–4-merous whorls of the perianth and 8 stamens; other authors definitely claim the flower to be trimerous. According to Schmidt (Beihefte zum Botan. Centralbl. B. XLV, 1929, II Abt. p. 378 ff.) the flower *Jeffersonia* does not show a whorled arrangement of its parts; *Jeffersonia* thus links the Berberidaceae and Ranunculaceae.

* Named after President Jefferson of the United States.

1. **J. dubia** (Maxim.) Benth. et Hook ex Baker et Moore in Journ. Linn. Soc. London XVII (1879) 377. — *J. manchuriensis* Hance in Journ. Bot. (1880) 258. — *Plagiorhegma dubium* Maxim. Prim. fl. Amur. (1859) 34; Nakai, Fl. Sylv. Kor. XXI, 64. — Ic.: Maxim., L. c., tab. II; Kom. i Alis., Oprod. I, Plate 173.

541 Perennial, 10–40 cm tall; rootstock short, horizontal, producing abundant roots and slender underground shoots, densely covered with very slender squamose leaflets with an amplexicaul base and an acute apex; all leaves radical, produced on rootstock in bunches subtended by two or more dry leaf sheaths, completely glabrous; petioles long, the blade suborbicular, up to 8 cm in diameter, cordate, broadly notched at apex, margins irregularly angularly notched; flowers solitary on long pedicels (as long as leaves), sky-blue or blue, hermaphrodite ca. 25 mm in diameter; fruit dry, dehiscing by an oblique apical aperture; seeds elongated, punctulate. April–May. (Plate XXXVII, Figure 7).

Shady and leafy mixed forests, singly or in small groups, on soil rich in humus, preserved in felled forests, and growing in shrubs, rarely in meadows. — Far East: Uss. **Gen. distr.:** Jap.-Ch. (Manchuria). Described from the lower reaches of the Amur River (near Pakhal). Type in Leningrad.

Note. This species deserves to be studied for its alkaloids since the closely allied American species *J. diphylla* Pers. contains berberine and other as yet unknown alkaloids.

Genus 542. **DIPHYLLEIA*** L. C. RICH

L. C. Rich. in Michx. Fl. bor-am. I (1803) 203.

Inflorescence apical, subumbellate; flowers white; sepals 6, similar to petals; petals 6, barely larger than sepals, flat; stamens 6, distinct; anthers opening by two apical valves; pistil one; stigma orbicular, distally flattened; ovules few, biserial; fruit berry-shaped, indehiscent; seeds oblong; perennial herbs with a horizontal rootstock; leaves peltate, 2 on stem, palmately-lobate, with palmate venation.

1. **D. grayi** Fr. Schmidt, Reisen im Amurl. (1868) 109, 218. — *D. cymosa* Gray, Jap. pl. (1859) 380 nec Michx. Fl. bor.-amer. I (1803) 203. — Ic.: Miyoshi et Makino, Pocket Atlas. Alp. pl. Japan. II (1907) tab. 64, f. 369; Takeda in Tokyo Botan. Mag. XXIV (1910) 255.

542 Perennial, 30–50 cm tall; stout, creeping rootstock producing numerous root fibers; at base of stem few, large, brown, scarious sheaths; stem with two alternate, petiolate leaves; leaves 20–25 cm long, peltate, broadly rounded-reniform, apically 2-lobed, with 7–9 branching main veins, pubescent below — mainly along veins, irregularly angularly dentate; teeth 10–12, triangular, some larger than others, smaller teeth arranged between the larger; inflorescence a subumbellate, 8–12-flowered corymb; peduncles pubescent, simple or branching; flowers white; fruit a blue berry; seeds 6–9, pyriform. June. (Plate XXXVII, Figure 13).

* From the Greek *dio* — two, and *phyllon* — leaf.

Damp, humus-rich valleys.— Far East: Sakh. **Gen. distr.:** Jap. (high mountain region of Central and Northern Japan). Described from Sakhalin (Arkovo, Due, Kussunai and elsewhere). Type in Leningrad.

Genus 543. **EPIMEDIUM** * L.

L. Gen pl. ed. V (1754) 53.

Sepals 8, petaloid, colored; outer sepals smaller and not as brightly colored as the rest; petals 4, resembling nectaries, with spurs or miters arranged in decussate pairs; pistil one; stigma scarcely broadened; ovules numerous, biseriate along ventral suture; capsule siliquiform, bivalvular, the smaller dorsal valve deciduous in fruit thus leaving open the larger lower seed-bearing valve; seeds small, their sutures developed into arils; embryo slightly curved; perennial herbs with creeping rhizome; leaves mostly radical or 1 or 2 on a stem, blade simple or twice ternately dissected, lobules small-toothed.

- | | | |
|----|---|--|
| 1. | All leaves radical | 2. |
| + | 1 or 2 cauline leaves present | 4. |
| 2. | Inner sepals ovate, subrhombic; petals minute, orange, spur not more than 1.5 mm long, saccate | 1. <i>E. pinnatum</i> Fisch. |
| + | Inner petals obovate, narrower than in preceding species; spurs 2–3 mm long | 3. |
| 3. | Flowers sulfur-yellow; miters brown | 2. <i>E. colchicum</i> (Boiss.) Trautv. |
| + | Flowers bright yellow; all petals, bright yellow, with spirally reflexed apex | 3. <i>E. circinnatocucullatum</i> D. Sosn. |
| 4. | Spur longer than sepals, ca. 2 cm long; lobes of fully-developed leaves large, scarious, glabrous | 5. <i>E. koreanum</i> Nakai |
| + | Spur much shorter than sepals; lobes of fully-developed leaves large, pubescent beneath | 4. <i>E. pubigerum</i> Morr. et Decn. |

Subgenus **EUEPIMEDIUM** Franch. in Bull. Soc. Bot. France XXXIII (1846)
98.— Flowers with dimerous whorls of perianth and stamens.

543 Section 1. **GYMNOCAULON** Franchet l. c.— Stems leafless.

1. *E. pinnatum* Fisch. in DC., Syst. II (1821) 29; Ldb., Fl. Ross. I, 87; Boiss., Fl. Or. I, 102; Kom., Vved. vo Fl. Kit. Mongolia, 128.— *E. pteroceras* Morr. in Ann. Soc. Gand. I (1845) 145, tab. 14; Kom. in A. H. P. XXIX, 146.— Ic.: Fischer, Sert. petropolit. fol. 1; Bot. Mag. tab. 4456.— Exs.: Buhse, No. 931.

* From the Greep epi — on, and Medion — Media, growing in Media.

Perennial; stem up to 50 cm tall; rootstock large, cylindrical, producing shoots; all leaves radical, imparipinnate, with 1–2 pairs of lobes or twice ternate, bearing long, caducous, white or rufous hairs, glabrous towards tip, at base of petiole several scales; petioles thickened, often barbate; leaf lobes membranous at first turning coriaceous, 3–5-nerved, cordate, with cartilaginous margin, serrate; scapes single, rarely 2, thin, cylindrical; loose raceme always elongated; pedicels glandular-hairy or glabrous, elongating at end; bracts short, oblong, glabrous; bracteoles 2; flowers pale, sepals and petals deciduous; stamens ascending; capsule on inconspicuous pedicel. March.

Shady mountain forests.—Caucasus: Tal. **Gen. distr.:** Iran. Described from Gilyan. Type in Leningrad.

Economic importance. An ornamental plant of gardens and rockeries.

2. **E. colchicum** (Boiss.) Trautv. *Increm. fl. ross.* in A. H. P. VIII (1884) 65; Kom., *Vveden. k Fl. Kitaya i Mongol.* VI, 129, — *E. pinnatum* var. *colchicum* Boiss., *Fl. Or.* 1 (1867) 102. — *E. pinnatum* var. *integrifolium* Medw. et Alb. v Trud. *Tifl. Bot. Sada* I (1895) 15. — Exs.: HFR No. 1704. (sub *E. pinnatum* var. *colchicum*).

Perennial, very close to the preceding, from which it is readily distinguished by the obovate, narrower petals, spur twice as long, and lobes often larger, sometimes entire (var. *integrifolium* Medw. et Alb.). March.

Damp, shady forests.—Caucasus: W. Transc. **Gen. distr.:** As. -Min. Described from W. Transcaucasia. Cotype in Leningrad.

3. **E. circinnatocucullatum** Sosn. in Grossg., *Fl. Kavk.*

Perennial, very close to the preceding from which it is distinguished by the color and form of the shorter petals; sepals four times as long as petals; filaments one and a half times as long as the anthers, thus the stamens forming erect columns. March–April.

Forests.—Caucasus: W. Transc. (Sochi). Endemic. Described from Sochi. Type in Tbilisi.

544 Section 2. **PHYLLOCAULON** Franchet, l. c. — Flower-bearing stems with 1–3 leaves.

Series 1. **Monophylla** Kom., *Vved. vo Fl. Kitaya i Mongolii* (1908) 130. — Stem with only one leaf.

4. **E. pubigerum** (DC.) Morr. et Decne. in *Ann. Sc. Nat. Ser. 2*, II (1834) 354; Boiss., *Fl. Or.* I, 101; Kom., *Vved. vo Fl. Kit. i Mong.* 131. — *E. alpinum* Ldb., *Fl. Ross.* I, 81, non L. — *E. alpinum* var. *pubigerum* DC., *Syst.* II (1821). 2. — Ic.: Sibth. et Sm. *Fl. graeca*, tab. 150 (sub *E. alpino*); Rouy, *Illustr. pl. Europ. rar.* I (1895) tab. 22; fasc. 6 (1896) tab. 127. — Exs.: Bornm. *Pl. Anatol. orient.* (1890) No. 1863; Bourgeau *Pl. armen.* No. 9.

Perennial; stem 40 cm tall, rootstock short, thickened, distinctly nodular; radical leaves 2, cauline leaves solitary; all leaves twice ternately partite, lobes ovate, cordate, serrate, coarse-toothed; petioles pilose, articulated; lobes of leaves persistent, pubescent beneath, the midribs covered with appressed hairs. Raceme branching, not dense; sepals pale red, ovate-oblong, concave, obtuse; petals yellowish, short, cucullate. April.

Shady mountain forests. — Caucasus: W. Transc. **Gen. distr.:** Bal. -As. Min. Described from the environs of Istanbul (Constantinople). Type in Geneva.

5. **E. koreanum** Nakai, Fl. Sylv. Kor. XXI (1936) 63. — *E. macranthum* Forb. et Hems. in Journ. Linn. Soc. XXIII (1886) 32, non Morr. et Decne. (1834); Kom. Vved. vo. Fl. Kit. i Mong., 131; Kom., i Alis. Opr. rast. Dal'nevost. kraya. I, 564.

Perennial; stem 40 cm tall; rootstock rather thin, horizontally creeping; radical leaves usually absent, rarely 2 and then as long as the flower-bearing stem; cauline leaves solitary, twice ternate, lobes long-petioled, thin, coriaceous, deeply cordate, when young appressed-hairy beneath with ciliate margin, soon losing hairs but for the articulation of the petioles; raceme short, simple or slightly branching proximally, sessile opposite leaf; rhachis glabrous or pubescent; bracts ovate, pedicels glabrous or glandular; flowers comparatively large, ca. 2 cm in diameter; sepals ovate-lanceolate, acute, white or pink; petals white or violet, with elongated, orbicular blade, often slightly notched at apex; spur much longer than sepals, subulate, with small glands, yellowish; capsule ovate-oblong, with long style, 6–8-seeded. April.

Shady forests. — Far East: Uss. (near Preobrazhenie Bay). **Gen. distr.:** Jap. -Ch. Described from Japan. Type in Paris.

545 Genus 544. **LEONTICE** * L.

L. Gen. pl. ed. V (1754) 147.

Sepals 6–9, petaloid, outer sepals smaller than the rest; petals 6, yellow, truncate, markedly shorter than sepals, resembling nectaries; stamens 6, free; anthers opening apically by two valves; pistil one, stigma small, sometimes slightly broadened, ovules 2–4, erect from base; capsule inflated, scarious, neither dehiscent nor opening at apex. Perennial herbs, with tuberiform thickened rootstock; cauline leaves few, usually ternately dissected.

1. Stem shorter than inflorescence, producing 1 or 2 leaves 2.
- + Stem producing single bracteate leaf below inflorescence 4.
2. Large plant (40–50 cm tall), with strongly branching inflorescence 2. *L. ewersmannii* Bge.

* From the Greek *leontike* — name of a plant with leaves parted like the paw of a lion.

- + Small plant (20 cm tall), with unbranched inflorescence 3.
- 3. Capsule indehiscent, inflated 1. *L. incerta* Pall.
- + Capsule dehiscing at apex 3. *L. minor* Boiss.
- 4. Lobes of bracteate leaf broadly oval 6. *L. darwasica* Rgl.
- + Lobes of bracteate leaf lanceolate 5.
- 5. Ovary stalked 7. *L. albertii* Rgl.
- + Ovary sessile or subsessile 6.
- 6. Petals without basal saccate extension, with 2 erect apical teeth at apex 8. *L. smirnowii* Trautv.
- + Petals with basal saccate extension, with 2 recurved apical teeth . . . 7.
- 7. Stamens slightly longer than petals (nectaries) 4. *L. altaica* Pall.
- + Stamens twice as long as the petals (nectaries) 5. *L. odessana* Fisch.

1. *L. incerta* Pall. Reise III, Anhang (1776) 726 No. 84; B. Fedch. v Tr. SPb. Bot. Sada. XXIII (1904) 358; Kryl., Fl. Zap. Sib. V, 1225.—*L. vesicaria* Pall. Act. Acad. Petrop. pro anno 1779 (1783) pars posterior p. 257; Ldb., Fl. Ross. I, 80.—Ic.: Pall. Act. Petrop. pro anno 1779 (1783) pars posterior, tab. 9, f. 4 (tuber); Goebel, Reise Casp., vol. II, tab. 1.—Exs.: Reliqu. Lehmann. No. 46.

546 Perennial, 10–16 cm tall; tuber spherical; cauline leaves usually 2, rather long-petioled, ternately or twice ternately divided into 5 cm long, ovate or elliptic, entire, slightly fleshy lobes; the lateral lobes sometimes 2-sect; flowers in terminal raceme, ca. 12 mm in diameter; pedicels in axil of orbicular bracts; sepals elliptic or ovate, four to five times as long as the minute petals, nearly reniform in outline, distally obscurely toothed, abruptly tapering into a slender claw half the length of the limb; pistil with very short style and subsessile stigma; capsule 25 mm in diameter, subglobular, inflated like a bladder, indehiscent; seeds dark brown. April–May.

Semideserts.—Centr. Asia: Ar. -Casp., Balkh., Syr D. Gen. distr.: Dzu. -Kash. Described from the vicinity of Lake Inder. Type not preserved.

2. *L. ewersmannii* Bg. in Arb. Naturf. Vereins zu Riga. Bd. I, No. 47 (1847) 131; Boiss., Fl. Or. I, 100.—*L. leontopetalum* Ldb., Fl. Ross. I (1842) 81 (in adnot.) non *L. apiifolia* Fisch. in Herb.

Perennial; tuber ovate, 5–12 cm in diameter; stem 20–40 cm tall, subterranean part nearly as long; radical leaves 1 or 2, their petioles more than 15 mm long below ground, not more than 2–3 cm long above ground, divided into three petiolate lobes; primary lobes 3-sect, of the 3 secondary lobes the middle petiolate lobe tripartite, with sessile, deeply bipartite lateral lobes; cauline leaves 3–5, the two lower ones petioled, similar to the radical leaves in their division, with basally branched petioles, the 1–3 remaining cauline leaves terminal, smaller, approached to the inflorescence, less incised or quite entire; inflorescence terminal, raceme 20–40-flowered; bracts subamplexicaul, elliptic, orbicular; pedicels large, 5 cm long, horizontally spreading, hexahedral; sepals ovate-oblong; ovary with 2 or 3 ovules; stigma obtuse; capsule inflated into a bladder, 15 mm in diameter, truncate, dehiscing toward ripening of seeds; seeds 1 or 2, globular. March–April. (Plate XXXVII Figure 4).



PLATE XXXVII. 1—*Berberis sibirica* Pall; 2—*B. integrerrima* Bge; 3—*Diphylleia Grayi* Fr. Schmidt; 4—*Leontice ewersmannii* Bge; 5—*Bongardia chrysogonum* (L.) Boiss; 6—*Leontice darwasica* Rgl; 7—*Jeffersonia dubia* (Maxim.) Benth. et Hook.; flowers at bottom of Plate; *Caulophyllum robustum* Maxim., flowers, fruit.

Sandy and clayey steppes, and fallow fields on loess soil.— Centr. Asia: all regions except Ar. -Casp. **Gen. distr.:** Arm. -Kurd., Iran. Described from the Syr Darya deserts of Yaman-Kizyl-Kum and Batkak-Kum. Type in Leningrad, cotype in Paris.

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Economic importance. The large tubers contain a significant quantity of starch, from which liquor is distilled; the plants also contain some active agents, which may be desirable for official use.

3. *L. minor* Boiss., Fl. Or. I (1867) 100.— Ic.: Citerne, Berberts Erythrosperm. (These) tab. 2, f. 8, 21 (1892) Sec. Stapf. Ind. Londinensis.

Perennial, 10–20 cm tall; close to preceding species, but tuber smaller; leaves twice pinnatipartite, 8–15 cm long, lobes smaller, deeply incised into obovate-cuneate lobules; raceme not branching; bracts markedly shorter than the slightly curved fruiting pedicels; petals cuneate-obovate, truncate, short-clawed at apex; capsule as long as pedicel, ovate, orbicular, obtuse, seeds smaller. March–April.

Dry, barren slopes and stony habitats.— Caucasus: S. and E. Transc.; Centr. Asia: Amu D. (near Termez). **Gen. distr.:** Iran. Described from Iranian Azerbaijan. Type in Geneva.

4. *L. altaica* Pall. in Act. Acad. Petrop. II pro anno 1779, 255 (1783 ed. 1) pars posterior; Ldb., Fl. Alt. II, 51; Fl. Ross. I, 80 (excl. pl. Odessana); Kryl., Fl. Zap. Sib., 1070.— Ic.: Pall., l. c., tab. 9, f. 1–3.

Perennial; tuber subglobular, 10–20 mm in diameter; stem 5–25 cm tall; cauline leaves solitary, 5 cm long; petiole of cauline leaf broadened, very short, with 2 connate bracts, divided into three long petioles each bearing 4 to 5 palmately divided lobes, these with slightly fleshy, entire, obtuse, 3 cm long lobules; flowers 10–25, in a terminal raceme, 12–18 mm in diameter; pedicels 6–13 mm long, recurved in fruit; bracts orbicular, entire; sepals elliptic or oblong-ovate, two to two and one-half times as long as the petals; petals cuneate, longitudinally folded at base, with a nectar-pit, truncate, with 2 curved teeth; stamens slightly longer than petals; ovary sessile or subsessile; style nearly as long; fruit an orbicular, membranous capsule, 8 mm in diameter, splitting at apex before the 3 or 4 blackish brown seeds ripen. April–May.

Stony hills and slopes.— W. Siberia: Irt., Alt. Endemic. Described from Altai. Type not preserved.

Economic importance. This and, even more so, the following species of *Leontice* deserve to be grown as early-blooming ornamentals. They are readily cultivated, as they easily adapt to Leningrad winters.

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5. *L. odessana* Fisch. ex Rogov., Obzor rast. Kievsk. uch. okr. (1869) 307.— *L. altaica* β *odessana* Fisch. ex DC., Syst. II (1821) 26.— *L. altaica* Boiss., Fl. Or. I, 101 et auct. fl. ross.; Shmal'g., Fl. I, 33.— Exs.: Dörfler Herb. norm. No. 4811.

Perennial, 10–20 cm tall. Very close to preceding species, from which it is distinguished by the stamens being twice as long as the petals. Its clear demarcation from its Altai parents induced me to recognise it as a separate species. March–April.

Steppes.— European part: Bl. (from Odessa to Nikolaev, also Tiraspol); Crim. (reported by Boissier but in the Flora of the Crimea—Kuznetsov,

Bush, Fomin, Mat. dlya Flory Kavkaza—was not entered). Gen. distr.: Bal. (Dobruja). Described from the vicinity of Odessa. Type in Leningrad.

6. *L. darwasica* Rgl. in A. H. P. VIII (1884) 692.—Ic.: Rgl. tab. XIV, f. 4 p., q., r., t.

Perennial, 25–30 cm tall; tuber compressed above, 4 cm in diameter, torulose; radical leaves solitary, long-petioled, nearly as long as stem, 3-partite, lobes sessile, elliptic-rounded, entire, stem with one, very rarely 2, leaves borne below the inflorescence, leaves not petioled, with a short amplexicaul sheath; lobes of cauline leaves subsessile or very short-petioled, ovate-rounded, entire, one or 2 of the cauline lobes rarely 3-partite; inflorescence terminal, 6–10-flowered, slightly bent or drooping; bracts suborbicular, usually crenate-dentate, shorter than the pedicels; pedicels ascending, yellow, reddish outside, elongated at end of flowering; sepals 5–6, petaloid, oblong-ovate or oblong, obtuse; petals half the length of the sepals and of the same number cuneately oblong, notched and dentate; anthers bilocular, dehiscing by a valve from base to summit; ovary oblong-lanceolate, short-pedicel, tapering into a style slightly shorter than the ovary. (Plate XXXVII, Figure 6).

Stony mountain slopes and among shrubs. — Centr. Asia: Pam. — Al. Endemic. Described from Darvaz near Shikaya on the Pyandzh River below Kalaikhumba. Type in Leningrad.

7. *L. albertii* Rgl. in Gartenflora XXX (1881) 293.—Ic.: Rgl. l. c., tab. 1057.

551 Perennial, 20–25 cm tall; tuber slightly flattened, subspherical; cauline leaves solitary, 5 cm long, subsessile, divided into three petiolate lobes, palmately dissected into 4–5 linear obovate flat lobules, with recurved margins at flowering; flowers 5–15, 12–18 mm in diameter, in terminal raceme; pedicels 6–13 mm long, slightly retrorse or horizontal in fruit; bracts ovate, nearly as long as pedicels, violet at first turning green later; sepals elliptic or oblong, with 5 brown ribs, two and a half times as long as the petals; petals cuneate, longitudinally folded at base, trifid, with two horizontally spreading lateral lobes, median lobe bidentate; ovary ovate, pedicel; fruit an orbicular, membranous capsule dehiscing prior to seed ripening, 3–4 blackish-brown seeds. April.

Stony hills and among shrubs in mountains. — Centr. Asia: T. Sh., Pam. — Al. Endemic. Described from W. Tien Shan. Type in Leningrad.

8. *L. smirnowii* Trautv. in A. H. P. VII (1881) 405; Boiss., Suppl. Fl. Or. 22; Bush, Ranales Kavkaza, 212.—Exs.: Herb. Fl. cauc. No. 216.

Perennial, 30–50 cm tall; tuber slightly flattened above, subglobular, 6 cm in diameter; radical leaves solitary, long-petioled, tripartite with broad sheath at base; lobes palmately divided, long-petioled, lobules entire, broadly elliptic, generally orbicular or notched, very rarely bipartite; cauline leaves sessile below inflorescence, with a short, amplexicaul sheath; blade divided as in radical leaves; terminal raceme few-flowered; bracts suborbicular, with numerous nerves, the lower ones ca. 1 cm long; pedicels spreading or ascending, two to two and one-half times as long as the bracts;

sepals oblong, ca. 1 cm long; petals half the length of the sepals, cuneate, without basal saccate extension, with 2 erect apical teeth; ovary oblong-elliptic; style not longer than 1 cm, markedly shorter than ovary. February.

Forests. — Caucasus: E. Transc. (Kakhetiya). Endemic. Described from Kakhetiya. Type in Leningrad.

Economic importance. An ornamental plant adapted to semishady habitats.

Genus 545. **BONGARDIA** * C. A. M.

C.A.M., Verz. Pfl. Caucas., (1831) 174

Sepals 3–6, petaloid, in indistinct whorls; stamens 6, free; anthers not acuminate, distally dehiscent by two valves; pistilons with plicate broadened stigma; ovules 4–8, orthotropous; capsule inflated into a membranous bladder; seeds small, subglobular, depressed at base; embryo small, radicle under base of endosperm covered with an endopleural fold. Perennials, with a tuberlike thickened rootstock; leaves all radical, pinnatisect, with opposite or whorled lobes; flowers in a strongly branching leafless panicle inflorescence with almost dichotomous branches.

1. **B. chrysogonum** (L.) Boiss., Fl. Or. I (1867) 99; Ldb., Fl. Ross. I, 80. — *Leontice chrysogonum* L. Sp. pl. (1753) 447. — *Bongardia Rauwolfii* C. A. M. Verz. Pflanz. Cauc. (1831) 174; Ldb., Fl. Ross. I, 80. — *B. olivieri* C. A. M. ibid., I, 86. — Ic.: Jaub. et Spach, Illustr. pl. or. IV, 396; Bot. Mag., tab. 6244. — Exs.: Aitch. Afg. delim. com. No. 145; Herb. Fl. cauc. No. 28.

Perennial, 30–50 cm tall; tuber thickened, 3.5 cm in diameter; stems leafless, strongly branching; leaves all radical, oblong, pinnatipartite, with lobes sessile, opposite, sometimes whorled, orbicular or cuneate, oblong, 3–5-fid at apex with squamiform bracts at base of branches; sepals colored; petals obovate, markedly longer than the sepals; capsule oblong, tapering at both ends. March–April.

Steppes, field crops, clayey and solonchik slopes. — Caucasus: E. and S. Transc.; Centr. Asia; Kyz. K., Kara K., Mtn. Turkm., Amu D., Syr D., Pam. — Al. Gen. distr.: Bal. — As. Min., Iran. Described from Greece. Type in the Linnaean Herbarium.

Economic importance. Baked or boiled, the tubers are edible.

Genus 546. **CAULOPHYLLUM** * L. C. RICH

L.C.Rich, in Michx. Fl. bor.-am. I (1803) 204. — *Phtheirotheca* Maxim. ex Rgl. in Bull. Ac. St. Pétersb. XV (1857) 224.

Sepals 9, the outermost much smaller than the petaloid inner ones; petals 6, much smaller than the sepals, resembling nectaries, broadening

* Named after the botanist Bongard, member of the St. Petersburg Academy of Sciences.

** From the Greek *kaulon* — stem, and *phyllon* — leaf.

(like a valve); stamens 6, free; anthers distally dehiscent by two valves; pistil one, style not broadened, with a stigmatic surface on the inside; ovules 2, orthotropous; capsule membranous, soon disintegrating and exposing the still unripe glabrous seeds, appearing like drupes; embryo very tiny. Perennials, with a tuberlike thickened rootstock; the leaves pinnately or ternately dissected, with slender lobules; stem with 1 or 2 leaves; flowers yellow, in short racemes or cymes.

1. **C. robustum** Maxim. Prim. Fl. Amur (1859) 33; Kom., Fl. Manchzh. II, 326. — *C. thalictroides* Rgl. in Bull. Acad. Pétersb. XV (1857) 223, non Michx. — *C. thalictroides* var. *robustum* Maxim. in herb. — 553 *Phtheirotrocha cyanosperma* Maxim. ex Rgl. in Bull. phys.-math. Ac. St. Pétersb. XV (1857) 223, nom. — *Leontice robustum* Diels, Fl. Central China (1901) 337, nomen. — Ic.: Kom. i Alis., Oprod. rast. Dal'nevost. kraya, 175.

Perennial, 50–150 cm; rootstock horizontal or ascending, large, nodose, sparsely covered with black hairlike roots; with 4 dry vaginal leaves at base of stem and 1–3 green leaves higher up, the lower of which are long-petioled, the others sessile, all ternate, with long-petioled, pinnatipartite lobes, with entire, rarely 1–2-toothed margin; inflorescence paniculate, few-flowered; markedly overtopping the leaves; flowers pale yellow, 1–3 on long pedicels, petals oboval, subspatulate; seeds globular, black, with a bluish bloom, resembling a berry, but dryish, at maturity the epidermis separates in the form of a shell. June. (Plate XXXVII, Figure 8).

Virgin or partly cut coniferous and deciduous forests, even oak, on shaded, damp humus; in forest stands, often near rocks, in coniferous forests particularly along valley streams. — Far East: Uss., Sakh. Gen. distr.: Jap. - Ch. Described from the lower reaches of the Amur. Type in Leningrad.

Genus 547. **BERBERIS*** L.

L. Gen. pl. ed. I (1737) 94.

Sepals 8–9, colored and resembling the petals, outer sepals smaller; petals 6, nearly as large as the sepals, usually convergent, in two imbricate whorls, with 3 glandules; pistil one, stigma peltate; ovules several, erect from base; fruit an indehiscent berry; embryo rather large. Shrubs with spiny bracts at base and simple leaves usually with a spiny-dentate margin. Flowers in racemiform inflorescences always yellow, on short lateral branches, rarely solitary.

Economic importance. Most species of *Berberis* are of economic importance, since the berries of all the species are delicious raw and as preserves. The widely cultivated *B. vulgaris* L. is particularly well-known in this respect. Species of *Berberis* are equally important as producers of nectar and as a source of yellow dye. At the same time they are notorious as intermediate hosts of rust fungi.

* The Latin name of the plant.

1. Flowers solitary or in axillary groups of 2-3 2.
- + Flowers in many-flowered racemes or inflorescence paniculate . . . 3.
2. Berries red 1. *B. sibirica* Pall.
- + Berries black 2. *B. kaschgarica* Rupr.
3. Inflorescence paniculate. Berries black 4.
- + Flowers in long racemes. Berries red 5.
4. Berries globular 3. *B. heteropoda* Schrenk.
- + Berries oblong 4. *B. oblonga* Schneid.
5. Berries globular 11. *B. nummularia* Bge.
- + Berries oblong 6.
6. Leaves membranous, rarely slightly coriaceous 7.
- + Leaves thickly coriaceous 8.
7. Leaves larger, 6-10 cm long, very slender, nerves only slightly elevated but distinct. Petals notched 7. *B. amurensis* Maxim.
- + Leaves smaller. Young branches bright yellow or brownish red. Prickles generally simple. Leaves unequally dentate 6. *B. orientalis* Schneid.
- ++ Leaves smaller. Young branches gray or pale yellowish brown. Prickles usually ternate. Leaves more uniformly dentate. Petals entire 5. *B. vulgaris* L.
8. Leaves narrowly lanceolate, usually large-toothed 9.
- + Leaves broadly lanceolate, often entire 10.
9. Leaves without stomata on the upper surface. Pedicels 4-5 mm long **B. poiretii* C. K. Schn.
- + Leaves with stomata on the upper surface 8. *B. crataegina* DC.
10. Leaves obovate or oblong, entire or subentire 9. *B. integerrima* Bge.
- + Leaves broader, without papillae beneath generally with a dentate margin 10. *B. turcomanica* Karel.
- ++ Leaves obovate or oblong, entire or dentate, with or without papillae beneath 12. *B. densiflora* Boiss. et Buhse.

1. *B. sibirica* Pall. Reise II, Anhang (1773) 737; Ldb., Fl. Ross. I, 79; Kryl., Fl. Zap. Sib., 1226. — *B. altaica* Pall. Fl. Ross. II (1778) 41. — Ic.: Pall. Reise, tab. I, Fig. 2; Pall. Fl. Ross. II, tab. 67.

Shrub, 1 m tall, rarely taller, strongly branching, spiny; branches brown, with long (to 14 mm) 3-5-7-partite spines longer than the leaves; leaves small, usually not longer than 20 mm and not broader than 8 mm, the mature leaves coriaceous, oblong-ovate, with subulate-dentate margin, tapering into a short petiole; young leaves with spiny-dentate margin; blade with stomata on the upper surface; flowers solitary, on peduncles shorter than the leaves, but as long as the flowers; sepals ovate, obtuse; petals as long as the sepals and of similar shape but with incised-notched apex; stamens half the length of the petals; berry red, broadly oval, up to 9 mm long. May-June. (Plate XXXVII, Figure 1).

Rocks, stony and desert slopes, and rock streams, mainly in low mountain zones, rarely in the alpine zone. — W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau.; Centr. Asia: Dzu.-Tarb. (Dzungarian Ala-Tau, from a single locality). **Gen. distr.:** Mong. Described from Altai. Type in Leningrad.

2. *B. kaschgarica* Rupr. in Osten-Saken et Rupr. Sertum tianschanicum (1862) 38. — Ic.: Maxim. Flora tangutica, tab. 23.

Shrub, one m tall, strongly branching, spiny; branches brown, with long 3-partite spines, up to 15 mm, longer than the petals; leaves small, usually

not longer than 15 mm and not broader than 6 mm, the mature leaves coriaceous, oblong-ovate, entire or with one acute lateral tooth, tapering into a short petiole; flowers solitary, their pedicels as long as the flowers, shorter than the leaves; sepals ovate, obtuse; petals as long as the sepals and of similar shape but with incised-notched apex; stamens half the length of the petals; berry black, broadly oval, up to 8 mm long. May—June.

Centr. Asia; T. Sh. Gen. distr.: Dzu.-Kash. Described from the Suukty valley in Chinese Tien Shan, 50–60 km to the north of Kashgar. Type in Leningrad.

3. *B. heteropoda* Schrenk in Fisch. et Mey. Enum. pl. Schrenk. I (1841) 102; Ldb., Fl. Ross. I, 742; Kryl., Fl. Zap. Sib. 1073. — *B. sphaerocarpa* Kar. et Kir. in Bull. Soc. Nat. Mosc. XIV, 3 (1841) 376. — Ic.: C. K. Schn. Handb. Laubholzk. I, 298.

Shrub, 2 m tall; branches reddish or brown, with 1–3 cm long simple or tripartite spines, borne at base of reduced branches bearing crowded leaves; leaves glabrous, smooth, obovate, finely and obscurely dentate or entire 6 cm long, 3–4 cm broad, thinly coriaceous or membranous, tapering into a short petiole; inflorescence a raceme, 2–5 cm long, irregularly branching, subpaniculate; flowers 5–9 in each raceme, yellow, on 6–12 mm long pedicels; sepals and petals obovate; stamens half the length of the petals; berry subglobose, 12 mm in diameter, bluish-purple. May.

Stony mountain slopes. — Centr. Asia: Dzu-Tarb., T. Sh. Gen. distr.: Mong. (S. Altai), Dzu.-Kash. (Kuldja). Described from the Ala Tau Mountains (Dzungaria). Type in Leningrad.

556 4. *B. oblonga* (Rgl.) C. K. Schn. in Bull. Herb. Boiss. II, sér. V (1905) 458. — *B. heteropoda* var. *oblonga* Rgl. in A. H. P. V, 1 (1887) 227. — *B. heterobotrys* E. Wolf, Nov. vid barbarisa iz Turkestana v Tr. po prikl. bot. i sel XI (1918) 40–43. — Ic.: Vol'f l. c.

Shrub, 2.5 m tall, branching; young branches brown, turning gray when old; spines simple or tripartite, 15 mm long; leaves obovate, oblong or elliptic, 6 cm long, membranous, grayish green above, glaucescent beneath, tapering into a petiole, with entire or slightly dentate margin; flowers 1 cm in diameter, usually 10–20, rarely more in branching paniculate racemes; pedicels 8 mm long; ovary oblong, with 1–3 ovules, short-pedicelled; berries black with glaucous bloom, oblong-elliptic, 1 cm long, not more than 6 mm broad; usually with single seed. May.

Stony mountain slopes. — Centr. Asia: T. Sh., Pam.-Al. Endemic. Described from Chatkal (W. Tien Shan). Type in Leningrad.

5. *B. vulgaris* L. Sp. pl. (1753) 330; Ldb., Fl. Ross. I, 79; Boiss., Fl. Or. I, 102; Shmal'g., Fl. I, 32. — Ic.: Rchb. Ic. Fl. Germ. III, tab. 18. — Exs.: HFR No. 602; Meinsh. herb. Fl. ingr. No. 29.

Shrub, 2.5 m tall; strongly branching, with markedly elongated branches, yellowish or yellowish-purple when young; in the second year turning gray; spines usually tripartite, 2 cm long; leaves membranous, 4 cm long, elliptic, obovate or obovate-oblong, obtuse, rarely acute, tapering into a petiole, greenish and distinctly reticular beneath; inflorescence racemiform, 6 cm long, with 15–25 flowers; pedicels 5–12 mm long; sepals and petals obovate; berries ellipsoidal or ellipsoidal-oblong, 12 mm long, bright red. May—June.

European part: Lad.-Ilm., U. Dnp., V.-Don, Bl., Crim., L. Don: Caucasus: Cisc. **Gen. distr.:** Centr. Eur., Med., Bal. Described from Europe without details. Type in London.

Economic importance. The wood of this species is hard, and has bright yellow sapwood. It is used in the manufacture of cobbler's nails and tools for lathework; the berries contain malic acid, which is used in confectionery, and also both yield a good dye used to color hides and wools a lemon yellow. It is a fine nectar plant and a very striking ornamental shrub, due to the variety of its red foliage. It is notorious as the host of the aecial stage of the rust *Puccinia graminis* Pers., which in turn infects wheat and other grasses that develop in the late summer and fall. Although it is recommended that barberry be destroyed we are against this since the most dangerous form of rust in the Soviet Union, the yellow rust of grain *Puccinia glumarum* Pers., does not develop on barberry. Ed.

6. *B. orientalis* C. K. Schn. in Bull. Herb. Boiss. sér. II, V (1905)-666.—*B. vulgaris* var. *orientalis* Boiss. in Herb.—*B. vulgaris* auct. fl. cauc.

Shrub, 2 m tall; young branches yellow-brown, slightly ribbed; old branches grayish; spines various, simple and tripartite; leaves elliptic or elliptic-lanceolate, 4.5 cm long, sometimes rather thin (var. *litoralis* (Rupr.) Grossh.), sometimes coriaceous, more acute (var. *emarginata* (Boiss.) Grossh.), margin obscurely toothed, leaf color the same on both sides, venation distinct; racemes 7 cm long, with 20 or more flowers, sometimes reduced (var. *brachybothrys* (Boiss.) C. K. Schn.), pedicels 10 mm long; berries oblong, bright red.

Caucasus: S. and E. Transc. **Gen. distr.:** Arm.-Kurd., Iran. Described from Iran. Type in Geneva.

7. *B. amurensis* Rupr. in Bull. phys.-mat. Acad. St. Petersburg. XV (1857) 260.—*B. vulgaris* var. *amurensis* Rgl. Tent. fl. Ussur. (1861) 46.—*B. regeliana* Koehne ex Schneid. in Mitt. deutsch. dendrol. Gesellsch. XIV (1905) 119.—*lc.*: Schneider III. Handb. Laubholzk. I, 298; Kom., i Alis., Opred. rast. Dal'nevost. kraya, Plate 173 f. 1—7. Nakei Fl. sylv. Kor. XXI, tab. V.

Shrub, 3.5 m tall; few-branched, the poorly developed branches turning grayish in the second year; spines usually tripartite, up to 2 cm long; leaves membranous, elliptic or obovate-oblong, 10.5 cm long, obtuse or acute, with dense irregular aculeate teeth, bright green beneath, with a sharply protruding network of veins; inflorescence racemiform, 10 cm long, with 10—25 drooping flowers; pedicels 10 mm long, flowers pale yellow; sepals obovate; petals notched; berries red, ellipsoidal, ca. 1 cm long. May.

Forest margins and on stony soil along banks of mountain streams.—Far East: Uss. **Gen. distr.:** Jap.-Ch. Described from the Amur River valley. Type in Leningrad.

Economic importance. An ornamental shrub; the fruit is suitable for making confections.

**B. poiretii* C. K. Schn. in Mitt. Deutsch. Dendr. Ges. XV (1906) 80 et in Laubholzk. II (1912) 920.—*B. chinensis* Poir. in Lam. Encycl. XIV (1808) 617, p. p.—*B. sinensis* *β angustifolia* Rgl. in A. H. P. II, 2 (1873) 416.—*B. poiretii* var. *angustifolia* (Rgl.) Nakai, Fl. Sylv.

558 Kor. XXI (1936) 66, tab. IV.—Ic.: Bot. Mag. tab. 6573; Useful Plants of Japan I, 300.

Shrub, 1.5 m tall; young branches and, sometimes, the older branches as well reddish brown, shiny, canaliculate-angular, densely leafy; spines not branching, one cm long, rarely tripartite or obsolete; leaves small, narrow, thickly coriaceous, 4 cm long oblong, tapering into a petiole, with an apical mucro, conspicuous venation and entire or slightly dentate margin; inflorescence racemiform, racemes [sic!] slightly longer than leaves with 10–20 flowers; pedicels 6–10 mm long; ovules one; berries dark purple. May.

Sandy mountain slopes and river sands. — Far East: Uss., sands along Amur River, at the mouth of the Sungari River.* Gen. distr.: Mongolia, Jap.-Ch. Described from N. China. Type unknown.

8. *B. crataegina*** DC. Syst. II (1821) 9, — *B. iberica* Stev. et Fisch. ex DC., L. c. 6. — *B. vulgaris* var. *iberica* DC., l. c. — Ic.: C. K. Schn., III. Handb. Laubholz. I, 304.

Shrub, 1 m high; branches cylindrical, brownish-purple, glabrous; prickles simple, firm, slightly dilated at base, 20 mm long; leaves coriaceous, oblong, 4 cm long, congested on petioles, with mucro at apex and conspicuous network of veins, entire or few-toothed; inflorescence racemiform; pedicels 6–10 mm long, ovules 1. May.

Dry slopes. — Caucasus: E. Transc. (Tbilisi). Gen. distr.: As.-Min., Arm.-Kurd., Iran. Described from Asia Minor. Type in Geneva.

9. *B. integerrima* Bge. in Delect. semin. Hort. bot. Dorpat. (1843) p. VI.—Ic.: Bge. in Reliq. Lehmann. tab. I.

559 Shrub, 4 m tall; strongly branching, spiny, with brownish or purple angular branches; on lower sterile branches, spines tripartite or with at least one lateral tooth on each side; on other branches spines simple, large; leaves coriaceous, obovate or oblong, not more than 4–5 cm long, 13–18 mm broad subapically, entire or subentire often with large, acute teeth on young shoots; leaves cuneately tapering into a petiole; inflorescence a long axillary raceme, 5 cm long or more, with 12–20 flowers; sepals and petals obovate; style very short, stigma large, retained at maturity when fruits usually pendulous; ovules 384; berries obovate or oblong, purple-red, with bloom, 7–8 mm long. May–June. (Plate XXXVII, Figure 2).

Stony mountain slopes. — Centr. Asia: Dzu.-Tarb. (only in Dzhungarian Ala-Tau), T. Sh., Pam.-Al. Gen. distr.: Iran., Dzu.-Kash. Described from Zeravshan. Type in Leningrad.

10. *B. turcomanica* Karel. in Ldb., Fl. Ross. I (1842) 79. — *B. integerrima* var. *turcomanica* C. K. Schn. in Bull. Herb. Boiss. II Ser. V (1905) 461.

Very close to the preceding species, from which it is distinguished by slightly broader leaves, usually with dentate margin, not papillate beneath. Racemes with fewer usually about 10 flowers.

Centr. Asia; Mtn. Turkm. Endemic. Described from the Great Balkhan Mountains. Type in Leningrad.

* These sands are found on the Chinese side of the Amur. *B. poirerii* never encountered within the Soviet Union. B. Komarov.

** Reports of the distribution of this species in the Caucasus are highly doubtful and should be referred to *B. orientalis* C. K. Schn. Ed.

11. *B. nummularia* Bge. in Delct. Sem. horti Dorpat. (1843) p. IV. — *B. densiflora* var. *nummularia* Boiss. Fl. Or. I (1867) 102. — Ic.: Bge. in Rel. Lehmann., tab. II.

Perennial, 4 m tall, strongly branching spiny shrub; branches brownish, sometimes purple, glaucescent when young; spines simple or ternate; leaves coriaceous, rounded-ovate, 3–4 cm long, 3 cm broad, entire, cuneate, rarely with few small apical teeth and usually with a small apical mucro, upper surface without stomata; leaves of young shoots with spiny-dentate margin; inflorescence an axillary raceme, 6 cm long, with 20 or more drooping flowers; sepals and petals obovate; berries ovate-globular, red, 5–6 mm long; ovules 2 or 3; seeds obovate. May – June.

Stony mountain slopes. — Centr. Asia: T. Sh., Pam. — Al. Gen. distr.: Iran. Described from Yagnob. Type in Leningrad.

12. *B. densiflora* Boiss., et Buhse in Nouv. Mém. Soc. Nat. Mosc. XII (1860) 9; Boiss., Fl. Or. I, 102. — *B. integerrima* var. *densiflora* C. K. Schn. in Bull. Herb. Boiss., II Ser. V (1905) 461; var. *erivanensis* C. K. Schn. ibid. — Ic.: Boiss., et Buhse l. c. tab. III.

Shrub, very close to preceding species but leaves slightly different — obovate or oblong, sometimes entire or dentate, with or without papillae beneath; all racemes many-flowered, sometimes with more than 20 flowers; pedicels not longer than 5–6 mm, berries 5–6 mm in diameter. April.

560 Stony mountain slopes. — Caucasus: S. and E. Transc. Gen. distr.: Arm. — Kurd., Iran. Described from Northern Iran. Type in Leningrad. Note. The following species remain obscure.

1. *B. emarginata* Willd., Enum. pl. Horti Berol. (1809) 395. Willdenow indicates "Siberia" as the origin of this plant, without providing further details. A study of the authentic specimen, at the German Herbarium, has led Schneider to consider it a hybrid of *B. vulgaris* × *sibirica*. However, the notched petals are more reminiscent of *B. amurensis*, but this plant had not yet been collected in Willdenow's time.

2. *B. tragacanthoides* DC., Syst. II (1821) 18, described by De Candolle from material collected by Tournefort in the vicinity of Tbilisi, near the Kura River (Herbarium Tournefort and Vaillant) and accepted in the Flora by Ledebour (Ldb., Fl. Ross. I, p. 80), was not mentioned before Fedde (Fedde, Monogr. Gatt. Mahonia in Engl. Bot. Jahrb., vol. I (1909) 131), who wrongly referred it to the exclusively North American genus *Mahonia*. The most plausible statement is by Ruprecht (Ruprecht, Flora Caucasi (1869) 49), who identified the plant collected by Tournefort in 1701 in Tbilisi as *Caragana grandiflora* DC., which grows there in abundance.

Family LXV. **MENISPERMACEAE** * DC **

Flowers small, dioecious, with some organs multiplied two or three times, whorled, corolla similar to calyx, carpels free, 1-ovuled, with two integuments;

* From the Greek *men* — moon, and *sperma* — seed, monthly seed.

** Treatment by V.L. Komarov.

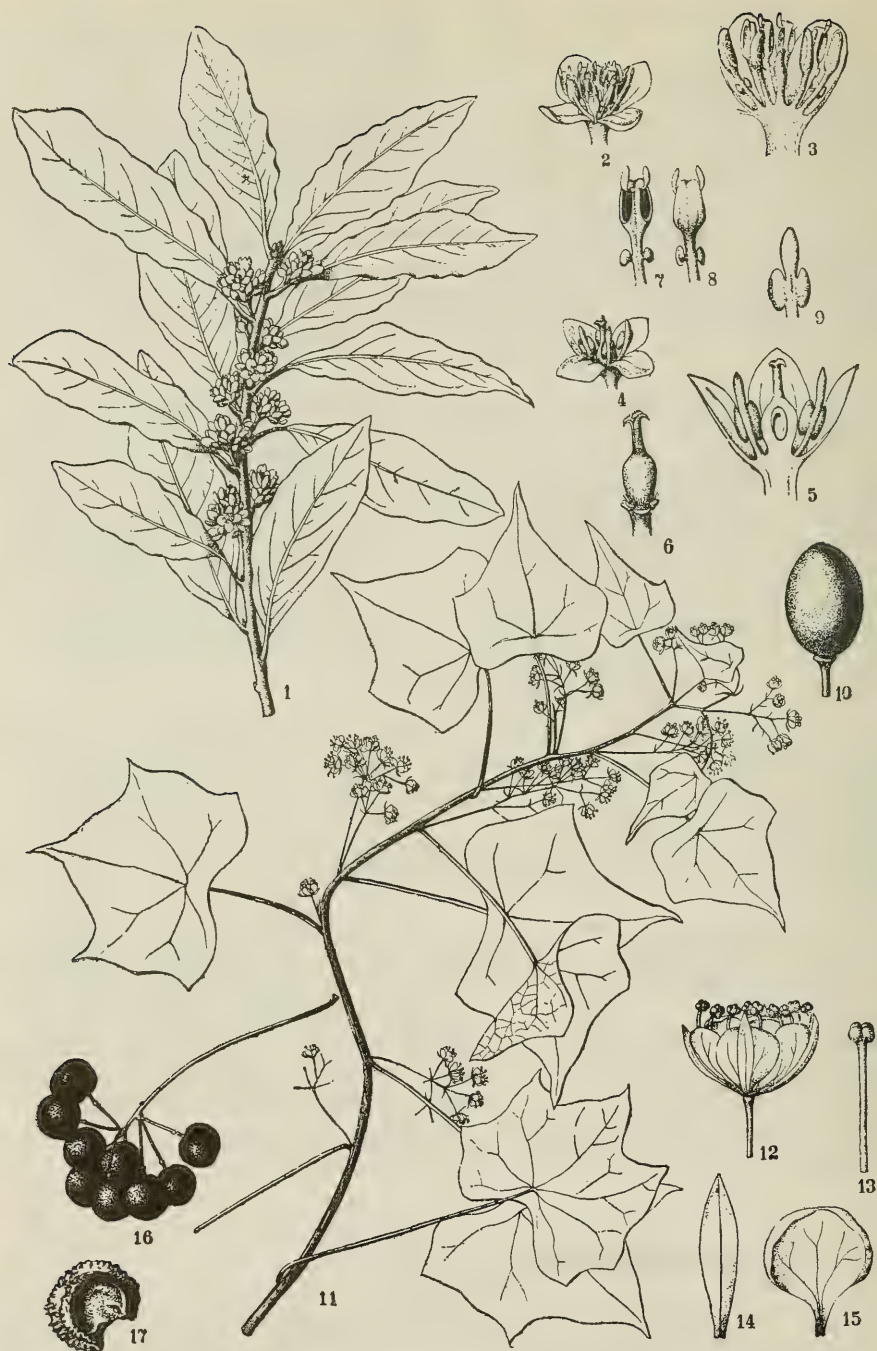


PLATE XXXVIII. 1-10 - *Larus nobilis* L.; 11-17 - *Menispermum dahuricum* DC.

fruit a drupe, embryo markedly curved, endosperm developed or none. Creeping, rarely erect shrubs, more rarely herbs; leaves corymbiform, with palmate venation. A tropical family of up to 300 species, including a few northern representatives.

Cocculus kaneii Heer — Paleocene, the Lower Don area (Osipov, Kharkov).

Genus 548. MENISPERMUM L.

L. Sp. pl. (1753) 340

563 Flowers dioecious, greenish; inflorescence a raceme or panicle; sepals 4—8, in two whorls longer than the petals; stamens 14—24, pistils 2—3, borne on the conspicuously elongated receptacle and surrounded by 6 sterile stamens; drupe globular or ovate, laterally flattened, distorted, with lateral crests or ridges. Creeping herbs, leaves broadly oval or orbicular with inconspicuous cordate base. Two species in all, one confined to the Atlantic basin in America, the other from Eastern Asia.

1. *M. dahuricum* DC., Syst. I (1818) 540; Prodr. I, 102; Turcz. Fl. baic.-dah. I, 90; Ldb., Fl. Ross. I, 78; Maxim. Prim. Fl. Amur. 30; Kom. in A. H. P. XXII, 332. — Ic.: Kom. i Al., Opred. r. Dal'nevost. kraya I, Plate 174. — *Menispermum Dauria*, Amur moonseed; in Tungan, Kochimki.

Perennial; stems green, creeping, dying almost to base in the winter; rootstock vertical, not stout, with lateral buds close to the apex; leaves alternate, petiolate, ebracteate peltate, in general rounded, with broadly notched base and 3—5 obscure acuminate lobes, lower leaves more nearly orbicular, the upper more sharply lobate, lobes more acute; only young leaves pubescent; peduncles axillary, solitary or in pairs, slender, not as long as petioles; bracts linear-setiform, membranous at base of lower pedicels; racemes not dense, with 1 to 30 flowers; staminate flowers ca. 6 mm in diameter, calyx of 4 linear sepals, opening long before flowering; petals 12, reniform-cordate, with claw emerging from notch, stamens to 16; pistillate flowers similar in appearance but darker, with stamens smaller, sterile; ovaries 3, on separate carpophores; styles short with curved stigmas; fruits solitary or paired, in a short raceme; berries black, with abundant dark-colored juice; seeds ca. 8 mm long and 7 mm broad, with ribbed outer margin. May, fr. September (Plate XXXVIII, Figures 11—17).

Banks of rivers and streams, sands, taluses, clayey outcrops, and among herbs or shrubs, often in riparian meadows; climbing on shrubs and tall grasses, producing supple decumbent stolons in exposed habitats, and bearing abundant fruit. — E. Siberia: Ang. - Say. Petrosheilova village near Minusinsk, Angara River), Dau.; Far East: Ze. - Bu., Uss., Uda (southwestern part). **Gen. distr.:** Jap. - Ch. Described from the rocky hills of Dauria. Type in Geneva.

Economic importance. Poisonous, containing dauricine, which acts violently on the stomach, and is the recognized cause of poisoning by the berries (E. Kardakova, Poisonous Plants of the Far East, 54); this plant deserves to be studied as a dye source and being very ornamental and rugged, is recommended for parks.

564 Note. Turchaninov reported that in Dauria he found no fruit-producing specimens among numerous staminate specimens; on the other hand, in the Ussuri area, fruits are produced in abundance. This fact suggests that the harsher climate of Dauria prevents the development of the ovary. Yet even in the village of Petroshilova, on the Yenisei, there are abundant fruit-bearing specimens. Cultivated specimens in Leningrad are always failing to bear fruit.

Family LXVI. **MAGNOLIACEAE** J. ST. HIL.*

Trees or shrubs, with alternate simple leaves and broad deciduous bracts, surrounding the flowering buds; flowers broad, solitary, the uppermost axial, bisexual; sepals and petals similar, imbricate; stamens free, numerous; anthers long, longitudinally dehiscent; pistils numerous, unilocular, borne spirally on elongated receptacle; ovules 2 or more; the numerous follicles form a dense aggregate fruit; seeds ovate, with a large oily endosperm and minute embryo.

In the Tertiary (and even in the Cretaceous), the representatives of the Magnoliaceae were widely spread far beyond their present area of distribution and even reached the high latitudes of the Arctic.

Magnolia capellinii Heer—Cretaceous, Sakhalin (Jonquieres); *M. dianae* Unger—Oligocene, Volga-Don area (Tim.); Eastern Caucasus Sarmatian (E. Georgia); *M. aff. grandiflora*—Paleocene, Lower Don area (Ushi); *M. ingfieldii* Heer—Early Tertiary or Upper Cretaceous, Ob area, Urals (Lozva); *M. nordenskioldii* Heer?—Lower Tertiary, Sakhalin (Mgachi); *M. primigenia* Unger—Oligocene, Volga-Don area (Tim.); *M. putivlensis* Krassn.—Paleocene, Lower Don area (Ushi) and Eocene, Middle Dnieper area (Putivl lavas); *M. regalis* Heer—Upper Cretaceous, Sakhalin (Jonquieres); and *M. sp.*—Lower Tertiary, in Sakhalin (Mgachi).

Liriodendron procaccinii Unger—Sarmatian deposits, Black Sea area (Krynka); *L. tulipiferum* L.—Tertiary (Pliocene?), Altai area (Chingiz-Tau).

1. Carpels opening by a dorsal suture, persistent on receptacle, leaves entire ***Magnolia** L.
- + Carpels narrow, folliculiform, indehiscent, deciduous when ripe; leaves lyrate ***Liriodendron** L.
- + Carpels globular, baccate, borne on an elongated receptacle; leaves oblong, acute 549. **Schizandra** L. C. Rich.

Genus* **MAGNOLIA** L.*

L. Gen. pl. ed. 1 (1737) 535.

Flower buds enclosed in a deciduous sheath; flowers single, terminal; sepals 3, petals 6–12, in three whorls; anthers introverse; carpels on

* Treatment by I.V. Palibin.

565 elongated receptacle; follicles numerous, drupe or berry, 1–2-seeded, persistent, dehiscing by a dorsal suture.

★**M. grandiflora** L. Sp. pl. ed. 2 (1762) 755. — Ic.: Baillon, Hist. Pl. 1, p. 133, f. 165–169; Sargent Silva of N. America I, tab. I–II (sub *M. foetida* Sarg.). — Exs. — Curtis, Second Distr. Pl. South. U. S. No. 4814. — English Bull. Bay, Big. Laurel; French, Magnolier; Polish, Bobrownick; German, Magnolie, Bieberbaum.

Tree, erect with pyramidal crown and light brown bark; leaves oblong or ovate, acuminate, entire, coriaceous, short-petioled, upper surface of leaves glossy, glabrous, the lower covered with dense, short, rufous-brown hairs; flowers single, terminal; sepals 6, rarely 9 or 12, petaloid; petals ovate or oval, concave above, coriaceous, cream-colored, aromatic; stamens light purple proximally; styles borne in spirals on elongated receptacle; follicles coriaceous, 1-seeded; seeds cuneate, ovoid, triangular, red, pendulous on long arils when ripe. (Plate XXXIX, Figure 3).

Grown on the southern shores of the Crimea, from Mshatka to Alushta and beyond, in gardens along the Black Sea coast of the Caucasus, from Tuapse to Adzharistan, throughout Transcaucasia, as well as in Lazistan, Trebizond, and other localities in Asia Minor and the Mediterranean region. In Central Asia, in Turkmenistan (Ashkhabad). It is a native of America, from North Carolina to Florida and Texas, where it grows in swampy forests along riverbanks.

Genus ★ **LIRIODENDRON** * L.

L. Gen. pl. ed. 1 (1737) 535

Flower bud enclosed in two caducous bracts; flowers terminal, solitary; sepals 3, petals 6, in two whorls; stamens numerous, extrorse; pistils spirally arranged; carpels on elongated axis, elongated-cuneate, dorsally keeled, becoming woody, elongated follicles, thickened at base, with one or two seeds.

★**L. tulipiferum** L. Sp. pl. (1753) 535. — Ic.: Curtis, Bot. Mag., tab. 275; Sargent, Silva of N. America 1, tab. XIII–XIV. — Liran; English, Yellow Poplar, Tulip Tree; French, Tulipier.

566 Tree, up to 50 and even 60 m tall, with gray or reddish brown bark; leaves spirally arranged, glabrous, lyrate, long-petioled, with 2 bracts, dark above, light green beneath; flowers terminal, solitary, short-peduncled, shaped like a tulip, yellow-green; petals elongate-elliptic; stamens long, almost as long as petals; anthers longer than the filaments; stigma infundibuliform; fruit a lignified samara. (Plate XXXIX, Figures 1, 2).

Natural habitat — eastern part of North America. Since 1640 cultivated in gardens and parks of Europe and North America, where it is one of the most beautiful trees, also grown in Crimean gardens, where it suffers badly from the climate, and is quite common on the Black Sea Coast of the Caucasus; south of Tuapse it becomes very common and is also cultivated in some parts of Central Asia (Tashkent). **Gen distr.:** N. Am. (from Massachusetts to Florida).

* From the Greek *lirion* — lily, and *dendron* — tree.

Flowers dioecious, perianth petaloid, 6–9-leafed; staminate flowers with 5 unusually short filamented stamens fused into a short, stout column; connectives dorsally connate in pairs, anther cells fused with the connective throughout their length, dehiscent by longitudinal splits; pistillate flowers without any rudiments of stamens, with very short-pedicelled, subcylindrical, receptacle, densely covered with pistils; ovary 2-celled, stigma oblique, stout, broad, with 2 narrow crests inside the margin. Ovules one in each cell, pendulous. During ripening the fruiting receptacle elongates 50 times, causing the aggregate fruit produced from one flower to appear like an erect, unbranched raceme densely covered with red, globular berries; seeds with large endosperm; embryo with oblong, thick cotyledons, the radicle turned towards the hilum. Liana. 7 species, Japan-China, the Himalayas, Java, North America.

1. *S. chinensis* (Turcz.) Baill. Hist. des Pl. I (1867) 148; Maxim. Mém. Biol. VIII, 370–371; Korsh. in A. H. P. XII, 302; Kom. ibid., XXII, 221. — *Kadsura chinensis* Turcz. in Bull. Soc. Nat. Moscou VII (1837) 149. — *Maximowiczia amurensis* Rupr. Bull. Acad. XV (1857) 124, 142, 259, 439. — *M. chinensis* Maxim. Prim. Fl. Am. (1859) 31.; Ic.: Rupr. Bull. Acad. XV, 136, Tab. 1; Maxim. Prim. tab. I; Kom. i Alis., Oprod. I, Plate 159. — In the Tungusic language, Kotsyalta.

567 Liana; stems woody, climbing up to 8 m, bark rugose, dark brown, branches directed upwards, often winding around main stem, young stems flexuous, with smooth, yellowish bark; leaves elliptic, obovate or obovate-elliptic, ca. 10 cm long and 5 cm broad, cuneate, gradually tapering to the tip, with few, often obscure teeth, somewhat fleshy, slightly hairy beneath along veins, dark green, often with red petioles and prominent midribs beneath; petioles ca. 3 cm; pedicels 1–4 cm slender, pendulous; flowers dioecious, ca. 2 cm in diameter, perianth white, waxlike, with a pleasant aroma, sometimes becoming pink before end of flowering; tepals 6–9, the outer drooping, the inner convergent, oval-oblong, obtuse, often narrower than the outer, antherous column half as long as perianth; pistils numerous, rounded, with short beak (style) and crest, becoming dark red after ripening; fruit globular or obpyriform, the numerous ripe pistils, forming a rather large "raceme"; seeds reniform, with verruculose surface. May–June, Fr. September. (Plate XXXIX, Figures 4a-d).

Mixed forests, particularly forest margins, streams and brooks, sometimes unbroken steppes, and coastal forests confined to sandy soil. In clearings where trees have been felled, it grows along streams, in the shade of rocks and thickets. Frequently climbing on trees to considerable heights. — Far East: Uss. and solitarily in Ze.-Bu., Sakh., Uda. Gen. distr.: Jap.-Ch. Described from mountains to the north of Peking. Type in Leningrad.

Economic importance. The Goldi hunters regarded the berries of *Schizandra* as a valuable means of strengthening themselves; they

* From the Greek *schizo* — to split, and *andros* — man and referring to the separation of the anthers from the receptacle.

** Treatment by V.L. Komarov.

reported (1895) taking the dried berries instead of other provisions on their sable hunts; a handful of the berries furnished enough strength to hunt sable all day. The berries contain a high concentration of sugar and malic acid and the seeds—in particular, the inner seed coat—contain a large quantity of essential oil; this oil is the cause of their aroma, as well as of their slightly acrid taste. The Chinese regard the bark, the roots, dried berries, and their peduncles (gelatinous decoction) as officinal but European medicine is as yet unacquainted with these remedies. Its abundant dark green and bright fruits make this liana a very desirable ornamental for parks and gardens.

Family★ **ANONACEAE** DUNAL*

568 Flowers usually bisexual, rarely unisexual, hypogynous or perigynous; sepals usually 3, free, or partially united; petals hypogynous, usually 6, in 2 whorls, rarely 4 or 3; stamens hypogynous, numerous, spirally arranged, the lower very short; anthers bilocular, dehiscing longitudinally, attached to the broad, truncate connective; carpels usually numerous, 1-multilocular; ovules erect or pendulous; fruit bacciform, rarely a capsule; seeds with plicate endosperm; embryo small, with short cotyledons. Trees or shrubs with aromatic wood and leaves. Leaves alternate-entire, exstipulate.

Anonaceae have been found in the Tertiary deposits of Western Transcaucasia—*Anona dsunsensis* Palib. (Goderskii pass, Pliocene); on Sakhalin—*Anona sachalinensis* Kryst. Due, Eocene (Pilvo); and in the Middle Dnieper area *Asiminospermum* sp. (Volyanshchina).

Genus★ **ASIMINA** ADANS.

Adans. Fam. II (1763) 365.

Flowers on drooping peduncles; sepals hypogynous, sessile, ovate or ovate-oblong; petals shorter than sepals; stamens linear-cuneate, crowded on receptacle; styles short, apical; stigmas sessile; ovules from 4 to 12, usually in 2 rows, anatropous; fruit on stout, ovate or oblong peduncle; seeds in 2 rows, with hard, cartilaginous, coriaceous cortex. Trees or shrubs, with entire, mesomorphic or subcoriaceous leaves.

A. triloba (L.) Dunal. Mon. Anon. (1817) 83.—*Anona triloba* L. Sp. pl. (1753) 537.—*lc.*: Curtis, Bot. Mag. tab. 5854; Sargent Silv. of N. Amer., 1, tab. XV—XVI.—

Shrub or tree, with brown bark and oblanceolate, glabrous, acuminate, short-petioled leaves, tapering at base; sepals ovate, pale green, pubescent on the outside; petals obtusely acuminate, dark purple or wine-red, netted-

* Treatment by I.V. Palibin.



PLATE XXXIX. 1—*Liriodendron tulipiferum* L., a) fruit; 2—*Asimina triloba* (L.) Dunal, branch with fruit, flowers, b) stamens, c) seeds, d) cross-section; 3—*Magnolia grandiflora* L.; 4—*Schizandra chinensis* (Turcz.) Baill., a) pistillate flower, b) stamen, c) ovary, d) aggregate fruit.

veined, wilking early, the outer petals recurved, the inner upright, one-third the length of the outer; stamens yellowish-green, several on one axis, usually oblong, cylindrical or orbicular, usually slightly curved, angular; pulp juicy, sweet; seeds 10–12 per fruit, brown. (Plate XXXIX, Figure 2, a-d).

Gen. distr.: N. Am. Cultivated for many years in gardens of the warm and temperate countries of Europe and North America. *Asimina* is cultivated in the USSR, in the gardens of Abkhazia (Sukhumi) and Adzharistan.

Economic importance. The sweet, juicy, creamlike pulp is edible; because it spoils rapidly it is not suitable for export.

571 Family LXVII. **LAURACEAE*** LINDL.

Flowers regular, bisexual or unisexual, in umbelliform or racemose inflorescences, few (2–5), small, greenish or yellowish; perianth 2-whorled, the tepals either basally connate or attached to broadened receptacle; stamens in 3–4 whorls, sometimes reduced to staminodes; filaments sometimes glandular, anthers dehiscent by valves; ovary superior, generally embedded in the hollow flower receptacle, unilocular; stigmas small; ovule solitary, anatropous; fruit bacciform or drupaceous; seeds without endosperm, embryo erect. Woody plants or shrubs, glandular in all parts, containing abundant aromatic oils; leaves alternate, rarely opposite, entire, coriaceous, ebracteate.

The many finds of laurel in the Lower Tertiary deposits of the USSR, notably in the region of evergreen plants—i.e., in the European part of the Soviet Union and the Caucasian region—prove a much wider distribution of this family in the geological past as compared to its present limits; the laurel of the infant part (Ukraine) survived to the Miocene (Sarmatian Krynka and Yafetid in the Sarmatia Sea).

Cinnamomum ellipsoideum Sap. et Mar. and *C. lanceolatum* Unger—Paleocene, the Lower Don area (Ushi near Kamyshin), the latter also in Ciscaucasia, Pliocene (Argun); Western Transcaucasia, Pliocene (Goderskii pass), Eastern Transcaucasia, Sarmatian (Khvteeba); *C. polymorphum* Heer—Oligocene, the Middle Dnieper area (Mogilno, Ryzhany); Sarmatian, Ciscaucasia (Bakanskaya, Adagum) and the Lower Tertiary, Ussuri area (Uglovskoe region); Oligocene, Western Transcaucasia (Sochi).—*C. rossmaesleri* Heer—Oligocene, Upper Dnieper area (Volyanshchina); Sarmatian, Eastern Transcaucasia (Khvteeba).—*C. scheuchzeri* Heer—Oligocene, Upper Dnieper area (Mogilno, Ryzhany); Sarmatian Ciscaucasia, (Bakanskaya, Adagum); Sarmatian Eastern Transcaucasia, (Khvteeba); in Western Transcaucasia (Goderskii pass); Lower Tertiary, Sakhalin, (Mgach.).—*C. subrotundum* Heer—Western Transcaucasia Sarmatian (Khvteeba).—*C. ucrainicum* Schmalh.—Oligocene, the Middle Dnieper area (Ekaterinopol); Upper Dnieper area (Volyn?).—*C. aff. sezannense* Wat.

* Treatment by I.V. Palibin.

Pliocene, Western Transcaucasia (Olty). — *C. sp.* — collected in Sarmatian deposits in the Crimea (Akhtiar); Tertiary, Western Transcaucasia (Olty); Tertiary, Sakhalin-Ussuri area (Uglovskoe region) and Kamchatka (Komandory). The last three are doubtful.

Laurus cf. Guischartii Gaud — in Sarmatian deposits of the Black Sea area (Krynka). — *L. lalages* Unger in the Oligocene of the Volga-Don area (Molotychi) and of the Upper Dnieper area (Mogilno); in Western Transcaucasia (Goderskii pass). — *L. primigenia* Unger — Paleocene of the Lower Don area (Osinovo Kharkov); in Oligocene of the Volga-Don area (Tim Molotychi); Ciscaucasia Lower Sarmatian (Apsheron); Mediterranean area (Kemakh, Khaivoldere); in Pliocene of Western Transcaucasia (Goderskii pass); Eastern Transcaucasia Sarmatian (Kakhetiya); Eastern Transcaucasia — Miocene (S. Osetiya), Sarmatian (Iora), Sarmatian (Khvteeba). — *L. princeps* Heer — Paleocene of the Lower Don area (Osinovo Kharkov); Western Transcaucasia Sarmatian (Khvteeba). — *L. schmidtiana* Heer — Upper Cretaceous of the Zeya-Bureya area (Tsayayan). — *L. vetusta?* Unger — Paleocene, Lower Don area (Osinovo).

Oreodaphne Heeri Gaud. var. *eglandulosa* Schmalhausen. In the Oligocene, the Upper Dnieper area (Mogilno). — *O. ucrainica* Kryshch. Upper Dnieper area, Oligocene (Mogilno).

572 *Daphnogene excelens* Eichw. — in Paleocene, the Upper Dnieper area (Osinovo? Chernigov); Rudnya Baranivska. — *D. (cinnamomum) lanceolata* Ung. — Pliocene of Western Transcaucasia (Olty).

Litsaea mangifera Saporta in Paleocene, the Lower Don area (Ushi).

Persea palaeomorpha Schimp. — Paleogene, the Lower Don area (Tarasovka). — *P. speciosa* Heer. — Oligocene, the Upper Dnieper area (Mogilno).

Sassafras ferretianum Mass. — Sarmatian, Black Sea area (Krynka).

Genus 550. **LAURUS** * L.

L. Gen. pl. ed. 1 (1737) 120; Sp. pl. (1753) 369

Flowers dioecious, in small umbellike inflorescences, enclosed in a globular involucre up to flowering; tepals 4, persistent; stamens 8–14, often 12; filaments bearing glandules at middle or at base, rarely the 2–4 outer ones without glandules. Staminodes in pistillate flowers, 4, with sagittate filaments, often bearing glandules on both sides. Drupe 1-seeded.

1. *L. nobilis* L. Sp. pl. (1753) 529. — Ic.: Sibth. et Sm. Fl. Graec. tab. 365; Rchb., Fl. germ. fig. 673; Vol'f. and Palib., Opred. der. i kust., p. 244. — Exs.: Fl. exsicc. austro-hung., No. 1439; Ross. Herb. Siculum, No. 373; Hohenack. Arzn. u. Handelspf. No. 128; Welwitsch. Iter lusitan., No. 62. —

Tree or shrub, with smooth, brown bark; leaves alternate, simple, entire, coriaceous, evergreen, oblong or lanceolate, acute, acuminate or slightly undulant inside of margins, short-petioled, grayish green, glossy above, pale beneath; axillary inflorescences, numerous, 1–3-flowered, [terminal inflorescences] with short pubescent pedicels, 4–6-flowered; scales of

* Ancient Latin name of this tree; meaning obscure, perhaps from *lavare* — to wash or from *laus* — pride, honor, praise.

involucre short-hairy or glabrous, tepals obovate, obtuse; fruit ellipsoid or ovoid, with jointed distally thickened peduncles, black when ripe.

Lower forest zone, mainly on limestones. — Caucasus: W. Transc., starting at Dagomys, continuing south to the Turkish border, and through Mingrelia and Imeretia in the east.

Economic importance. Laurel is very important as medicine and as food. The oil extracted from the fruit is officinal. In the south of the USSR it is cultivated everywhere as an ornamental plant. It contains essential oil (in the leaves 1.25%, according to Wemer); its fruit contains fatty oils (28% in the pulp, 72% in the seeds). The dried leaves are edible.

573 Order 21. **Rhoeadales** ENGL.

Flowers cyclic actinomorphic or zygomorphic with clear division into calyx and corolla, ovary 2- to many-carpelled; ovules with two integuments; pollen grains often with 3 nuclei. Endosperm nucleate. Herbs, rarely shrubs; flowers mostly in racemes. Leaves alternate, extipulate.

Key to Families

- 1. Sepals 4–8; petals 8 or none, stamens 3–40, capsule open at apex. Family LXXI. **Resedaceae** DC.
 - + Sepals 2–4; petals 4 (in exceptional cases, more, or absent), fruit closed 2.
- 2. Sepals almost always 2, capsule of 2–16 carpels Family LXVIII. **Papaveraceae** B. Juss.
 - + Sepals 4, rarely more; carpels often 2 3.
- 3. Fruit a capsule, berry or drupe, borne on a gynophore, seeds reniform. Flowers often slightly zygomorphic, stamens numerous, rarely 6 or 4. Family LXIX. **Capparidaceae** Lindl.
 - + Fruit a silique or silicle, sometimes a nutlet; sepals 4, in 2 whorls, stamens 6, of these 2 shorter and 2 longer Family LXX. **Cruciferae** B. Juss.

Family LXVIII. **PAPAVERACEAE** B. JUSS.*

Sepals 2, rarely 3 caducous at flowering either covering the entire bud (**Papaveroideae**) or else scalelike, minute, and not covering other parts of flowers in the bud (**Hypecoideae**, **Fumarioideae**); flowers actinomorphic or zygomorphic, bidentate (some **Fumarioideae**); petals usually 4, in 2 opposite pairs, rarely 5 or 6, free, very rarely (**Adlumia**) connate; stamens numerous, of an indefinite number (**Papaveroideae**)

* Treatment by M.G. Popov.

or 4 opposite petals (Hypecoideae) or 2 opposite outer petals (Fumarioideae) and then each stamen parted, appearing as if composed of 3 connate stamens terminated by 3 anthers; a median 2-celled, and lateral 1-celled stamens. Ovary often 2-carpelled, rarely of 3–20 carpels, 1-celled or with incomplete [sic!] spurious septa, with one style or sessile stigma; stigma of different forms: disklike, capitate, 2-partite or 2-lobulate; fruit usually a capsule dehiscent by 2 valves, rarely 3–6-valved or of many carpels and dehiscent by pores opening below the disklike stigma (*Papaver*); rarely fruit a small 1-seeded nutlet (*Fumaria*) or an elongated, siliquiform capsule breaking transversely (Hypecoideae); seeds usually small, black, glossy, smooth or striate or reticulate-pitted, with or without an aril. Annual or perennial herbs with milky juice (subfamily Papaveroideae) or without (Hypecoideae, Fumarioideae). Leaves alternate, or various shapes, sometimes much divided, rarely entire, opposite or whorled.

This family is divided into three subfamilies (Papaveroideae, Hypecoideae, and Fumarioideae), sometimes considered as distinct families.

Note. All species of Papaveraceae are more or less poisonous and are not normally eaten by livestock. — *Corydalis* and *Papaver* in particular provide interesting ornamentals. The most useful species is *Papaver somniferum*.

Key to Genera

1. Sepals scaphoid, tightly clasped in bud and completely enclosing other parts of the flower until flowering; petals broad, flat, entire; androecium polymeric, indefinite; seeds pitted-reticulate; milky juice usually quite fluid; plant often bristly or hairy, rarely glabrous (subfamily Papaveroideae) 2.
- + Sepals form a flat, usually small triangular calyx, in bud not enclosing the corolla; stamens 4 and simple or 2 and tripartite, seeds smooth or sulcate, not reticulate-pitted; inner petals 3-partite or dorsally keeled and crested; milky juice absent; gynoecium always dimerous; plants always glabrous (subfamily Hypecoideae, Fumarioideae) 6.
2. Gynoecium dimerous or 3–6-merous (*Roemeria*). Fruit an elongated siliquiform capsule, dehiscent to base by 2 or 3–6 valves 3.
- + Gynoecium (3-) 4–20-merous. Fruit a capsule opening by pores below the disklike stigma 556. *Papaver* L.
3. Corollas red or violet. Capsule dehiscent by 3 or 4, rarely 2, rarely 5 or 6 valves, with filiform placentas detaching from valves. Stigma sessile. Annual herbs, with bifid or trifid leaves 555. *Roemeria* Med.
- + Corollas yellow, rarely red. Capsule always dehiscent by 2 valves 4.
- 575 4. Capsule with spongy, thick spurious septa; stigma broadened, 2-lobed; corollas yellow, yellow with red or red with black spot; glaucous, xerophilous annual or biennial, rarely perennial herbs, with rosettes of slightly fleshy lyrate glaucous leaves. Seeds without appendage 554. *Glaucium* Adans.

- + Capsule aseptate; seeds borne directly on placental cord, which is preserved when valves become loose; corollas always uniformly yellow; seeds with crested appendage 5.
- 5. Pedicels 1-3, 1-flowered, arising from axils of ebracteate cauline leaves; stigma conspicuously 2-lobed; style long in fruit 553. *Hylomecon* Maxim.
- + Inflorescence umbelliform. Pedicels arising from apex of axillary peduncle, surrounded by small basal bracts; stigma obscurely 2-lobed—capitate. Style short. 552. *Chelidonium* L.
- 6. Stamens 4, simple, opposite petals. Flowers actinomorphic, spurless, small, usually yellow; inner petals tripartite; the middle lobe cochlear, with fringed margin; fruit elongated, siliquiform, often disarticulating transversely. Annual small herbs, with leaves multifid into thin linear segments (subfamily *Hypecoideae*) 551. *Hypocoum* L.
- + Stamens 2, tripartite, with 3 anthers each. Flowers either actinomorphic, outer petals with saccate basal extensions or zygomorphic, with spur formed by upper outer petal. Fruit a 2-valved capsule or (*Fumaria*) a nutlet 7.
- 7. Flowers actinomorphic, large, in semiumbellate inflorescences; inner petals prominently keeled dorsally, outer petals with saccate basal extensions (tribe *Dicentreae*) 8.
- + Flowers zygomorphic, with spur, in racemes (tribes *Corydaleae* and *Fumarieae*) 9.
- 8. Petals connate to three-fourths of their length; lower connate part resembles a jug, turning spongy in fruit and bearing narrow wings; climbing annual, up to 3 m long; with axillary inflorescences 557. *Adlumia* Raf.
- + Petals free, not turning spongy in fruit. Perennial, with isolated few-flowered inflorescences borne on distal parts of leafless stems 558. *Dicentra* Bernh.
- 9. Corolla from 6 to 45 mm long. Fruit a capsule. Seeds usually with appendage. Mostly perennial herbs 559. *Corydalis* Medik.
- + Corolla small; style deciduous in fruit; fruit a nutlet; seeds without aril. Annuals 10.
- 576 10. Corolla narrow, cylindrical; flowers in narrow racemes, usually pink-violet or white. Nutlet rounded, more or less regularly spherical 560. *Fumaria* L.
- + Corolla broader, on long pedicels, flowers yellow, borne singly in axils of leaves. Nutlet cylindrical 561. *Fumariola* Korsch.

Subfamily 1. **HYPECOIDEAE** Prantl et Kündig in Engl. Natülr. Pflanzenfam. III, 2 (1891) 137 (excl. gen. *Pteridophyllum* S. et Z.).

Buds drooping before flowering; sepals small, triangular, not enveloping corolla up to inception of flowering, not curved at margins; petals 4, in 2 whorls; outer petals entire, oblong, or flabelliformly 3-lobed; inner petals tripartite, the middle lobe cochlear, with fringed ciliate margin; lateral lobes entire, oblong, usually with violet spots or nerves; stamens 4, simple,

opposite petals; ovary dimerous; silique elongated, usually disarticulating transversely or not breaking, rarely dehiscent by 2 valves. Annual glabrous herbs, with narrowly dissected leaves, devoid of milky juice.

Genus 551. **HYPECOM*** L.

L. Gen. pl. (1737) 32.

Sepals semiscarious, ovate-triangular or oblong, much smaller than petals; petals white or yellow, rarely slightly pink-violet; stamens not exserted; filaments scarious, anthers linear, with a more or less conspicuous scarious mucro; stigma bipartite, with filiform branches sometimes fused into one linear stigma; fruit a silique disarticulating transversely, rarely dehiscent by 2 valves; seeds small, without appendage, gray or nearly black, somewhat rough or smooth, dull; annuals, rarely biennials, with a dense rosette of radical leaves; leaves short petiolate with oblong tripinnatisect blade; segments subsessile, nearly palmately bipinnatisect into linear or filiform lobules; stems several, overtopping leaves, inclined or decumbent and ascending, leafless below inflorescence, in inflorescence with much reduced, thinly dissected leaves; inflorescence dichasial, spreading.

- 577 1. Silique dehiscent by 2 valves, narrowly linear, erect. Seeds octahedral subgenus *Chiazospermum* (Bernh.) M. Pop. 2.
 + Silique indehiscent, fusiform, disarticulating into joints. Seeds flat, obliquely ovate (*Hypocoum* s.str.)
 2. Corolla yellow. Stigma branches longer, twisted or involute 1. *H. erectum* L.
 + Corolla white or white-pink. Stigma branches shorter, slightly recurved *H. erectum* var. *lactiflorum* (Kar. et Kir.) Maxim.
 3. Silique erect, with erect or horizontal but not recurved pedicel, not pendulous, readily disarticulating, rhombic in section 4.
 + Silique pendulous, on recurved pedicel, often disarticulating obliquely and with difficulty, sometimes almost inarticulate, rectangular in section with thick walls (series *Pendula* m.) 5.
 4. Flowers small, white or slightly violet; outer petals oblong, not lobed; middle lobe of inner petals cochlear, without fringed margin; silique very thin, narrowly linear, erect, on erect pedicel. (series *Leptocarpa* m.) 2. *H. leptocarpum* Hook. et Thoms.
 + Flowers large, yellow; outer petals 3-lobed, flabelliform, middle lobe of inner petals cochleariform, ciliate-fringed; silique more robust on horizontal pedicel, falcate or arcuate (series *Procumentia* m.) 3. *H. grandiflorum* Benth.
 5. Corolla large; outer petals broadly flabelliform, 3-lobed, up to 15 mm broad; stigma branches divergent, thin, long, up to 4 mm 4. *H. trilobum* Trautv.

* From ancient Greek root, but root and meaning not clear.

- + Corolla small, ugly; outer petals obscurely 3-lobed or entire; stigma branches short, divergent or not separating 6.
- 6. Outer petals slightly broader, obscurely 3-lobed; stigma branches usually not divergent; silique disarticulating, outer epidermis peeling off from joints in strips 5. *H. parviflorum* Kar. et Kir.
- + Silique not disarticulating even at maturity, epidermis not peeling off; outer petals narrower, oblong, without any trace of a lobe; stigma branches short-divergent 6. *H. pendulum* L.

Subgenus 1. **CHIAZOSPERMUM** (Bernh.) M. Pop.; Bernh. in Linnaea XII (1838) 62, gen. — Silique dehiscent by valves; seeds octahedral.

1. *H. erectum* L., Sp. pl. (1753) 124; Ldb., Fl. Ross. I, 93; Fedde, l. c. 97; Bush, Fl. Sib. i Dal'n. Vost. I, 3; Kryl., Fl. Zap. Sib. VI, 1230, — *Chiazospermum erectum* Bernh., l. c.; Ldb., Fl. Ross. I, 92. — *C. lactiflorum* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842); Ldb., Fl. Ross. I, 745. — *C. erectum* var. *lactiflorum* Maxim., Enum. 78 pl. Mong. (1889) 36; Fedde, l. c. 97. — Ic.: Bush, l. c.

Annual; leaves glaucous, dissected into filiform lobules; stem beyond its middle becoming diachasial, many-flowered inflorescences; pedicels erect, strong, up to 3 cm; sepals ovate-triangular, acute, narrowly membranous only at margin, 2–3 mm long. Corolla yellow (var. *typicum*) or pinkish-white (var. *lactiflorum* (Kar. et Kir.) Maxim.), large; outer petals broadly flabelliform, 3-lobed, up to 15 mm broad, and as long; middle lobe with green herbaceous nerve distally, inner petals tripartite, with large lateral lobes, with violet nerves, and with a small cochleariform middle lobe shorter than the lateral and without fringed margin; siliques narrowly linear, erect, up to 7–8 cm long, 1.5 mm broad dehiscent by valves; valves with parallel longitudinal nerves; internal septa either thin and quite transverse (var. *typicum*) or thicker and inclined to the right and left alternately (var. *lactiflorum* (Kar. et Kir.) Maxim.); seeds flattened, octahedral, dark brown, ca. 1.3 mm long; stigma short-bipartite, with widely (var. *typicum*) or slightly (var. *lactiflorum* (Kar. et Kir.) Maxim.) open lobes. May–August. (Plate XLV, Figure 5, a, b).

Stony slopes, sandy pine forests and steppes, weed-infested places. — W. Siberia: Alt., Irt.; E. Siberia: Dau., Ang.-Say.; Centr. Asia: Balkh. (Lake Zaisan, Arganat mountains — var. *lactiflorum*). **Gen. distr.:** Dzu.-Kash., Mong., Jap.-Ch. (N. China). Described from Siberia. Type in London.

Note. *H. lactiflorum* should not be accepted* as a species, since all its characters — except the color of the corolla — i.e., the length and curvature of the stigma lobes, the inclined septa, and the paucity of flowers, are linked by transitional stages with the typical yellow-flowered *H. erectum*. *H. lactiflorum* represents the more southern, more xerophilous type.

* Since the yellow-flowered variety in Siberia and the white-pink variety in Central Asia have fixed ranges, it may be assumed that they are independent species. (Editor).

Subgenus 2. **EU-HYPECOUM** M. Pop. — Fruit disarticulating transversely; seeds flat.

Series 1. **Leptocarpa** M. Pop. — Pedicels and siliques erect, siliques thin, erect, readily disarticulating; middle lobe of inner petals not fringed.

2. **H. leptocarpum** Hook. f. et Thoms., Fl. ind. I (1855) 276; Hook. f., Fl. brit. Ind. I, 120; Fedde, l. c., 94.

579 Biennial; root stout, vertical yellow; rosette of radical leaves dense, short, much shorter than stem; leaves glaucescent, 2- to 3-pinnatisect into small linear acute lobes; stems spreading, ascending in upper part; inflorescences dichasial, few-branched, 2-5-flowered; pedicels thin, erect, 2-7 mm. Flowers small; sepals small, 2-2.5 mm long, ovate, acute; corolla small, violet-whitish; outer petals oboblong, entire, not lobed, obtuse, ca. 6 mm long; stigma 2-partite, with short recurved branches; siliques erect, not pendulous, narrowly linear, thin, 2-3 cm long, 1-1.5 mm broad, readily disarticulating; silique compressed-rhombic in cross section, torulose along edges, with fine longitudinal nerves. June.

Stony slopes and dry riverbeds. — Centr. Asia: Pam. -Al. (Shugnan, Darvaz, seldom). **Gen. distr.:** Ind. -Him., Dzu. -Kash., Tib., Mong., Jap. -Ch. Described from the Himalayas. Type in London.

Series 2. **Procumbentia** M. Pop. — Pedicels horizontally spreading; silique ascending, not pendulous, usually bent, compressed-rhombic in section; middle lobe of inner petals with fringed margin.

3. **H. grandiflorum** Benth., Cat. pl. Pyr. (1826) 91; Boiss., Fl. Or. I, 125; Busch in Fl. cauc. crit. III, 4, 6; Fedde, l. c. 91. — Ic.: Gartenfl. tab. 1060; Bonnier, Fl. ill. France I, tab. 26, 115b. — Exs.: Bourgeau, Pl. Pyrén. Espagn. No. 333.

Annual; stems 10-20 cm high, numerous, stoutish, rising or ascending; leaves green, long, attaining half the length of the stem or more, with distant pairs of segments, tripinnatisect, with long acute lobes; inflorescences many-flowered, with numerous furcate branches, inflorescences and pedicels long, the latter horizontally spreading but not recurved, 4 cm long. Corolla yellow, rather large; sepals oblong, acute or subaristate-acuminate, 3-5 mm long; outer petals flabelliform, 3-lobed, ca. 8 mm wide; inner petals with small violet dots, middle lobe long-fringed, longer than lateral lobes; style 2-partite with strongly reflexed long slender branches ca. 1.5 mm long; silique ascending, falcate or hamate, rather thin, 3-5 cm wide, flattened, with prominent longitudinal nerves, readily disarticulating; seeds dark brown, 1.5 mm long. April - May. (Plate XLV, Figure 4).

Wormwood steppes and stony slopes. — Caucasus: E. and S. Transc. (Karyagino district, Armenia rarely). **Gen. distr.:** Arm. -Kurd., Bal. -As. Min., Med. Described from Spain.

580 Note. This species has relatively small flowers, much thinner and longer pedicels, and narrower and less torose siliques. It is surely a variety of the polymorphous group *H. grandiflorum*. — Fedde's record for Central Asia (Khiva, Willkomm, No. 124), is extremely doubtful.

Series 3. *Pendula* M. Pop. — Siliques pendulous, with arcuate pedicels, compressed-tetragonous in section, dehiscing with difficulty; flowers same as in preceding order.

4. *H. trilobum* Trautv. in A. H. P. IX (1884) 366 et IX, 2 (1886) 438; Fedde, l. c., 95. — Exs.: H. F. A. M. No. 561.

Annual; stem 15–30 cm high; segments of glaucous leaves sessile or short-petioled, broad, palmately or pinnately 1- or 2-sect into filiform-linear acute, slightly divaricate lobes; inflorescence usually strongly branched, dichasial; sepals small, ovate, obtuse, ca. 2 mm long. Corolla large, bright yellow; outer petals flabelliform, obtusely 3-lobed distally, 15–20 mm broad; middle lobe of inner petals as long as the lateral, crisply ciliate-margined, lateral lobes with large violet spots, entire at apex; stigma 2-partite, with filiform, ascending, 2 mm long branches; siliques fusiform, pendulous when mature, flattened-tetragonous in section, with one abruptly carinate nerve below in middle of valves and an obscure network of lateral nerves, breaking with difficulty along sutures, few-faceted, moderately angular, canaliculate, suberect; seeds gray, obliquely ovate, ca. 2 mm long. April–May. (Plate XLV, Figure 1, a–h).

Fields and clayey slopes in the semidesert zone. — Centr. Asia: Mtn. Turkm., Amu D., Pam. — Al. (western part), Syr D. (only Mirzachul), Balkh. (confined to the Ili). **Gen. distr.:** Iran. Described from Kizylarvat (Turkmenia). Type in Leningrad.

5. *H. parviflorum* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 141; Ldb., Fl. Ross. I, 745; Fedde, l. c., 96. — *H. pendulum* var. *parviflorum* Kryl., Fl. Zap. Sib. Ic.: VI (1931) 1230. — Ic.: Opr. r. Ochr. Jashk. II. — Exs.: HFR No. 1851; H. F. A. M. No. 560.

Annual; radical leaves almost half the length of the stem, glaucous, trisected as in preceding species into linear-filiform acute lobes; stems ascending; inflorescences few-flowered with elongated branches; pedicels and peduncles short, not larger than 1–1.5 cm; peduncles thick, recurved; sepals triangular-ovate, acute, 1–1.5 mm long, submembranous, often obscurely toothed. Corolla sulphur-yellow, small; outer petals obovate or oblong, obscurely 3-lobed, ca. 7 mm long, 5 mm wide; inner petals with violet spots, their middle lobe as long as the lateral lobes, with very short-fringed margin; stigma usually entire by cohesion or connection of branches, usually helicoid or very short bipartite at tip; silique pendulous, suberect, thick, compressed-tetragonous in section, with one abrupt carinate nerve along middle of valves and an obscure network of lateral nerves, moderately angular, breaking with difficulty, to 6–7 cm long, 3–3.5 mm wide, in ripe fruit epidermis peeling off liberating the pints; seeds gray, nearly as in *H. trilobum*. April–May. (Plate XLV, Figure 2, a, b).

Fields, clayey, rarely stony slopes in foothills of mountains and lower mountainous zones; also in sandy and clayey-stony deserts. — W. Siberia: Alt.; Centr. Asia: entire region. **Gen. distr.:** Dzu. — Kash., Iran., Ind. — Him. Described from the area of Lake Balkhash. Type in Leningrad.

6. *H. pendulum* L., Sp. pl. (1753) 124; Boiss., Fl. Or. I, 125; Shmal'g., Fl. I, 39; N. Büsch in Fl. cauc. crit. III, 4; Fedde, l. c. 95. — *H. caucasicum* G. D. J. Koch in Ldb., Fl. Ross. I (1842) 94.

Annual; whole plant similar to *H. parviflorum* but outer petals entire, without a trace of lobes, oblong; middle lobe of inner petals longer than the lateral lobes; stigma short but distinctly 2-partite, with divergent branches; epidermis not separating even in fully ripe fruit; fruit almost not breaking. April—May. (Plate XLV, Figure 3).

Clayey and rocky slopes, weed-infested places; sometimes in semideserts. European part: L. V., Bl. (rarely), Crim. (often); Caucasus: Dag., S. and E. Transc. (often). **Gen. distr.:** Med., Atl. and Centr. Eur., Bal.-As. Min., Iran. (the geographical boundary between *H. parviflorum* and *H. pendulum* has not been precisely determined. Described from Southern France (Provence). Type in London.

Subfamily 2. **PAPAVEROIDEAE** Prantl et Kündig, l. c. — Buds drooping up to inception of flowering; boat-shaped large green sepals form a closed receptacle enveloping all the remaining parts of the flowers; petals 4 (2 + 2), rarely 6 (3 + 3) or 5, obovate, oblong, orbicular or reniform, large, flat, not dissected, without any outgrowths, keels, appendages, or spurs, almost unclawed; stamens many. Ovary 2- or polymorous; fruit a capsule, siliquiform or opening by pores. Milky juice thick, white, yellow, or orange. Herbs, usually hairy or bristly, rarely glabrous.

Tribe 1. **CHELIDONIEAE** Rchb., Hand. (1834) 264 p.p.; Fedde, Papav. 203. — Milky juice orange; ovary 2-merous; apical stigma capitate, 2-lobed; fruit a reniform capsule with slender, persistent after dehiscing of valves, placentas supporting the stigmas; seeds appendaged. Perennial forest herbs.

582 Genus 552. **CHELIDONIUM** L.*

L. Gen. pl. ed. 1 (1737) 150

Petals yellow, small; stamens few, filaments thin, anthers oblong; ovary 1-celled, cylindrical; style conspicuous remaining short, thickish, cylindrical even in fruit; stigma small, scarcely broader than style, obscurely 2-lobed-capitate; capsule slender, siliquiform, dehiscing by 2 valves from base to apex; style 2 mm long. Milky juice thick, orange. A perennial herbaceous plant with a short rootstock. Stems leafy, branching; leaves glaucous beneath, glabrous or slightly crisply hairy, large, somewhat lyrate-pinnatisect with large, irregular, capitate-spatulate segments, radical leaves few, short-petioled; pedicels umbelliformly arranged in axils of upper cauline leaves, basally bracteolate, shorter than leaves. Milky juice poisonous; it is of interest to the metallurgical industry because it contains certain alkaloids and acids.

1. *C. majus* L., Sp. pl. (1753) 505; Ldb., Fl. Ross. I, 91; Boiss., Fl. Or. I, 124; Shmal'g., Fl. I, 38; N. Busch in Fl. cauc. crit. III, 4, 7 and

* Literal meaning in ancient Greek — "swallow grass," probably because the flowers blossom about the time the swallows arrive [in Greece] and wither on their departure.

in Fl. Sib. i Dal'n. Vost., 10; Kryl., Fl. Zap. Sib. VI, 1232; Kom., Fl. Manchzh. II, 339; Kom. i Alis., Oprod. Rast. Dal'nevost. kraya I, 568. — *C. luteum* Gilib. Fl. lithuan. (1781) 211. — Ic.: Rchb., Ic. Fl. Germ. III, tab. X, f. 4466. — Exs.: HFR No. 154.

Perennial; stems ribbed, up to 100 cm high, branching above, erect, glabrous or hairy beneath and at nodes; radical leaves few or many, most often with 5 pairs of segments, the proximal ones reduced, the terminal segment somewhat larger; petioles shorter than blade; segments irregularly incised crenate-spatulate, obtuse, often with basal accessory lobe in the form of an auricle, sessile and decurrent along rachis, upper segments often 3-lobed, the lower usually petioled; cauline leaves few, remote, with fewer segments than the radical leaves, very short-petioled, upper leaves sometimes subsessile. Segments glaucous beneath (very rarely green), glabrous, often crisply puberulent. Peduncles 5–10 cm; pedicels 3–8, somewhat unequal, as long as or slightly longer or shorter than the capsule. Flower buds oval-globular or obovate, obtuse or barely acuminate, glabrous or arachnoid, 7–10 mm long; petals bright yellow, oboblong or obovate, 8–16 mm long; capsules erect, slightly flattened, 2–5 cm long, 2–3 mm broad; seeds 1–2 mm long, black, oblong, with rows of punctate pits and a separate ribbon-like appendage. Fl. May–July, Fr. July–September. (Plate XL, Figure 1).

Open forests, groves, gardens, truck gardens, built-up areas, and fields. — Throughout the European part; all of the Caucasus (sporadic); all of Siberia with the exception of the Arctic; Centr. Asia: Dzu. -Tarb. and T. Sh. (eastern part). **Gen. distr.:** all Europe up to the northern coasts of the Mediterranean, E. Mong. Ch. with the exception of Tib., introduced into Atl. N. Am. Described: "In ruderatis Europae" (Linn., l. c.). Type in London.

Note. The genus *Chelidonium* must be regarded as monotypic. Previously described species related to *C. majus*, *C. laciniatum* Mill. (1768) and *C. grandiflorum* DC., (1824) afford classical examples of mutations of *C. majus*. *C. laciniatum* Mill., representing the western form, may be encountered in all the western provinces of the USSR, including the regions of Moscow and Leningrad. It differs from the type by its strongly incised leaf segments, dissected into lanceolate acute lobes, and by petals that are incised-dissected or else entire and acute. *C. grandiflorum* DC frequently differs by its larger corolla and shorter capsules, which are often shorter than the pedicels; the bracts are broad, ovate, obtuse. It is principally encountered in southern Siberia, from Altai to Dauria. Both species grow within the distribution area of the "typical" form and the intermediate crosses associated with it. The Siberian type differs in a general way from the European-Caucasian type by more elongated and narrower leaf segments, and often also by more numerous radical leaves, and more numerous segments; also, its leaves are almost always hairy beneath, whereas in the West glabrous plants grow with broader oval segments.

Economic importance. According to Wehmer the bright orange juice of the root celandine contains 6 or 7 alkaloids: chelidone, homochelidone, protopine, sanguinarine, and others; the composition of the leaf juice is even more complex; the seeds contain 50–66% fatty oil which is not currently utilized. The milky juice is pungent and bitter, has an unpleasant odor and an acrid taste. It is used to remove warts; in the past, especially in Germany, the juice was used to treat gout, scrofula, and other diseases.

It has an inflammatory effect on the skin and some doctors have tried it as a cure for cancer. Medieval alchemists endeavored to find in the "golden" root of the celandine some means of producing gold from less precious metals. In ancient Rome, according to Pliny, the plant was regarded as medicinal. The fresh foliage of the celandine, sprinkled with salt, are applied to sooth stomach swellings in sheep.

584 Genus 553. **HYLOMECON*** MAXIM.

Maxim Primit. fl. Amur. (1859) 36.

Perennial, glabrescent herbs, with oblique 1-4-capitate rootstock. Milky juice thick, orange; stems leafy; leaves membranous, pinnately dissected, with strong serrate segments, radical leaves 1 or 2, long-petioled; cauline leaves attenuate to stem apex, few, short-petioled. Pedicels 1-flowered, 1-3 at apex of stem, appearing as if arising from the axils of the upper leaves. Petals large, yellow; ovary 2-merous, 1-celled; style short in flower, considerably elongating in fruit; stigma small, distinctly 2-lobed, lobes often divaricate, rarely upright, covered with papillae confined to the inner side; stamens numerous, with yellow subfiliform filaments and oblong elongated anthers; capsule thin, siliquiform, sub-cylindrical, opening by 2-valves from base to apex; seeds large, with rows of punctate pits, with large flat riblike aril covering their entire length.

1. *H. vernalis* Maxim., l. c.; Kom., Fl. Manchzh. II, 337. — *H. japonica* Bush, Fl. Sib. i Dal'n. Vost I, 6; Prantl. u. Kündig in Engler, Nat. Pflanzenfam. III, 2 (1889) 139; Fedde in Engler, Pflzr. IV, 104, 209 (p. p.). — Ic.: Maxim., l. c., tab. 3; Rgl. in Gartenfl. XI, tab. 355. — Exs.: HFR No. 2351.

Perennial; stem 20-40 cm high, delicate; rootstock long, horizontal, brittle; [each year] 2-4 stems develop from rootstock, their base covered with brown scarious scales; leaves and stems glabrous; radical leaves with petioles up to 25 cm long, simple-pinnate; blades 10-20 cm long; segments (1-) 2-3-pairs, 2-8 cm long, 1-4 cm broad, oblong or rhombic-oblong, tapering basally, sessile and often decurrent along leaf axis, all segments of similar size, with slender acuminate tip, deeply unevenly biserrate, sometimes incised; terminal segment scarcely larger, often incised 3-lobed at apex; cauline leaves 2 or 3, approximate in upper part of stem, similar to radical leaves but with shorter pedicels, or sessile; pedicels 3.5-7 cm, shorter than leaves, upright, somewhat arachnoid or glabrous. Flower buds 8-10 mm long, ovoid, pointed, glabrous or covered with sparse hairs; petals delicate, yellow, flat, rounded-obovate, 1.5-2 cm long; capsule upright, 2-8 cm long, 3 mm broad, glabrous, coronate style up to 8 mm long; seeds 2 mm long. Fl. April-May, Fr. June-August. (Plate XL, Figure 2).

Shady, leafy forests of the Manchurian type. — Far East: Uss. Gen. distr.: Jap. -Ch. Described from Amur. Type in Leningrad.

585 Note. This mainland species of *Hylomecon* can be distinguished from from the insular *H. japonica* (Thunb.) Prantl et Kündig by its larger growth, more delicate, large, strongly acuminate leaf segments with more

* From the Greek *hylo* — forest, and *mecon* — poppy — forest poppy.

deeply biserrate margins, and the slight difference in size between the lower and the upper segments. Also the flowers of *H. vernalis* seem to be larger and brighter, and the silique longer than the corresponding organs in Japanese species. These differences are negligible and do not exceed those between *Chelidonium majus* and *C. grandiflorum*. On the Japanese Islands occur two types of *Hylomecon*, one with very reduced lower segments and a short apical segment, the other with subequal segments and a long acuminate apical one, but with a minute and evenly serrate margin (var. *subintegra* Fedde); the latter is especially close to *H. vernalis* Max.

Tribe 2. PAPAVEREAE Rchb. apud Moessler, Handb. ed I (1827) p. LVIII; Fedde in Pflanzenr. IV, 104, p. 221; Prantl u. Kündig in Engl., Nat. Pflzfam. III, 2, 141. — Annual, biennial or perennial herbs. Milky juice white or yellow, rarely orange. Ovary 2-merous or 3–20-merous. Stigma expanded, sessile, sometimes disklike, its lobes connate so that the stigmas appear as strips overlying the placentas (style absent or nearly absent). Fruit a siliquiform capsule dehiscing by valves or a reduced capsule opening by pores below the disklike stigma. Seeds without appendage.

Genus 554. **GLAUCIUM** * ADANS

Adans. Fam. d. plant. II (1763) 432; Fedde l.c. 221.

Annual or biennial, rarely perennial, slightly hairy herbs, with vertical root. Milky juice confined to roots, thin at first, later becoming thick. Stems branching, large, brittle; flower stalk solitary, axillary or terminal, 1-flowered remaining short, erect, rarely elongated, rarely recurved in fruit; flower buds acute; petals yellow or yellow [above] and red beneath or entirely red, in the last two cases with basal oblong black spot; stamens yellow, numerous; filaments slender; anthers elongated, linear; ovary 2-merous, 2-carpelled; style inconspicuous; stigma large, of 2 connate lobes flattened from side of valves, in lateral view hastate triangular, broader than high, with 2 laterally divergent horizontal or recurved horns; capsule siliquiform, long, usually cylindrical-linear, up to 25 cm long, dehiscing by 2 valves; valves rigid, subject to delayed and difficult dehiscence. Placental cords robust, united by a thick spongy septum produced from the fusion of 2 opposite [inwards-growing] placentas; seeds rather large, black, reticulate-pitted, slightly curved, oblong-reniform, without aril.

Note. The genus *Glaucium* should be divided into seven series. Six of these are listed below; the seventh *Contortuplicata* (type *G. contortuplicata* m Boiss., N. Iran). — is distinguished by its curved pedicels and subglabrous irregularly curved siliques, dehiscing from apex to base.

* From the Greek *glaukos* — glaucous, since the typical species of this genus have a uniform glaucous bloom.

1. Capsule dehiscing from top to bottom 2.
- + Capsule dehiscing from bottom to top, i.e., from base to apex. 8.
2. Ovary densely white-villous from slightly wavy, soft, white hairs.
Ripe capsules more or less densely covered with identical hairs or
bare. Flower buds canescent. Stems usually more densely leafy
(series *Corniculata* m.) 3.
- + Ovary covered with appressed, erect, acicular, squamiform or
papillary bristles or tubercles, or ovary glabrous. Stems medium-
leafy. Annual or biennial plants. 5.
3. Fruit stalks short, curved below. Siliques falcately curved, with erect
apex, much shorter. Stigma small. Ovary densely hairy. Radical
and cauline leaves entire, not pinnate, crenate . . . 1. *G. insigne* M. Pop.
- + Fruit stalks erect. Siliques straight or slightly arcuate, projecting
upward, very long. Leaves pinnatisect; lobes rather narrow. 4.
4. Flower buds 1–2 cm long, rarely 3 cm. Petals 1–3 cm across,
variously colored. 2. *G. corniculatum* (L.) Curt.
- + Flower buds 2.5–4 cm long. Petals 3–5 cm in diameter, reddish
orange with basal violet spot 3. *G. grandiflorum* Boiss.
5. Annuals (or biennials). Petals pale violet-red with black spot.
Siliques glabrescent or glabrous, very thick at base, with insignificant
thickened pedicles (series *Oxyloba* m.). 4. *G. oxylobum* Boiss. et Buhse.
- + Biennials. Petals often yellow, rarely reddish orange, sometimes
with basal red spot but never with basal black spot. Capsules not
so thick proximally (series *Flava* m.) 6.
6. Siliques thinner, 2–3 mm thick, glabrous, smooth, often slightly
moniliform owing to constrictions between the seeds. Petals orange
with a basal red spot 6. *G. leiocarpum* Boiss.
- 587 + Siliques thicker, 3–5 cm long, glabrous or with scattered acicular
setose hairs (with appressed bristles) or covered with tubercles,
without constriction between the seeds. Petals yellow or orange 7.
7. Lower leaves densely villous-pubescent, grayish; upper leaves
glabrous, very glaucous. Leaf teeth not mucronate or with short mucro.
Siliques (especially the ovarian section) partly covered with white
tubercles. Petals usually yellow or orange, sometimes with basal
red spot. Pedicles short. Mainly along shores of the Black Sea 5. *G. flavum* Crantz.
- + Lower leaves slightly hairy and more long-villous, sometimes
glabrescent. Leaf denticles hispid-aristate. Siliques (ovary) glabrous
or with scattered slender appressed acicular bristles. Petals
light or egg-yellow. Pedicels up to 20 cm long. Mountains of Central
Asia 7. *G. fimbrilligerum* Boiss.
8. Perennial or biennial. Stems almost leafless (has one, deeply
dissected non-amplexicaul leaf), all other leaves in a rosette. Petals
pale yellow, 1.5–2 cm in diameter. Capsule (ovary) covered with
rather dense slightly flattened aculeate papillae. Stigma rather larg,
3–4 mm in diameter (series *Squamigera* m.) 8. *G. squamigerum* Kar. et Kir.

- + Annuals. Stems medium-leafy; cauline leaves deeply amplexicaul, lobed or capitate; capsule with short bristles, papilliform to subacicular, rarely glabrous. Petals small, yellow, the inner red with an oblong black spot at claw. Stigma small, not more than 2 mm wide (series *Elegantiam*. = *G. elegans* s.l.) 9.
- 9. Stigma horns recurved. Petals 1.0–1.5 (–2) cm long. Flowers on lateral branches without leafletlike bracts immediately at the base 9. *G. elegans* Fisch. et Mey.
- + Stigma horns subhorizontal. Petals 6–9 mm long. Flowers on lateral branches subtended by 2 rather large nearly opposite bract-like leaflets 10. *G. bracteatum* M. Pop.

1. *G. insigne* M. Pop. in Korovin, Kultiassow et Popov, *Descriptiones pl. nov. e Turkestanica*. Pochvennye ekspeditsii v bass. r. Syr-Dar'ii Amu-Dar'ii, Vol. II (1916) 50, Plate 6.

Annual, small plant, to 10 cm high, canescent with white crisp flattened hairs; stem simple or branching from base, whitish; leaves entire, radical leaves oboblong, gradually tapering to a petiole, obscurely lobed, or crenate-dentate, small, 5 cm long, cauline leaves amplexicaul, broadly oval, large, acutely crenate-dentate. Flower buds narrowly fusiform to 1 cm long, canescent; petals ca. 1 cm long, obovate, yellow with basal black spot; ovary densely white-villous; pedicels 2–8 mm long, rather thin, arcuate; siliques 4–6 cm long, rounded in section, 2.5 mm thick, slightly moniliform, irregular, often falcate or arcuate, siliques with apex directed upward villous-pubescent with white, wavy, soft hairs, dehiscing with difficulty; stigma small, 3 mm wide, less than 1 mm long, nearly truncate or slightly convex; seeds black, reticulate-pitted, ca. 2 mm long. April–May.

Gypsiferous, mottled hills and bare slopes, very rare. — Centr. Asia: Pam. — Al. (near the village of Khodzha-Filat at the foot of Kugitang Mountain; village of Ak-Rabat between Guzar and Derbent, in fields). Described from the above mentioned localities. Type in Leningrad and Tashkent.

2. *G. corniculatum* (L.) Curt., Fl. Londin. II, VI (1798) tab. 32; Ldb., Fl. Ross. I, 93; Boiss., Fl. Or. I, 119; Shmal'g., Fl. I, 37; N. Busch in Fl. cauc. crit. III, 4, 10; Fedde in Pflanzenr. IV, 104, 223; Novopokr. in Zhurn. Novocherkassk. Otd. Russk. Bot. Obshch. 1, 41–47. — *Chelidonium corniculatum* L., Sp. pl. (1753) 506. — *Glaucium phoeniceum* Crantz, Stirp. Austr. ed. I, II (1763) 133. — *G. aureum* C. Koch in Linnaea XIX (1847) 49. *G. tricolor* Bernh. in Besser, Enum. pl. Volhyn. (1822) 69. — Ic.: Rchb., Ic. Fl. Germ. fig. 4470 and 4471; Sibth. et Sm., Fl. graec. tab. 488 and 489.

Annual (rarely biennial), 10–30 cm high, glaucous and grayish with crisp flat hairs; stem erect, angular — sulcate, rarely simple, upright, often branching with strict branches; radical leaves few, lyrate, often deeply pinnatisect, with elongated, narrowly oblong, lanceolate or sublinear, irregularly sharp-toothed lobes; apical lobe small, obtriangular, slightly lobed or sharp-toothed; cauline leaves abundant, rather large, sessile, semiamplexicaul, deeply pinnatisect, with several lobes narrower than the radical lobes. Flower bud acutely oblong, acute, villous, to 2.5 and even 3 cm long; petals 1–3 cm long, obovate or orbicular, often entirely wine-

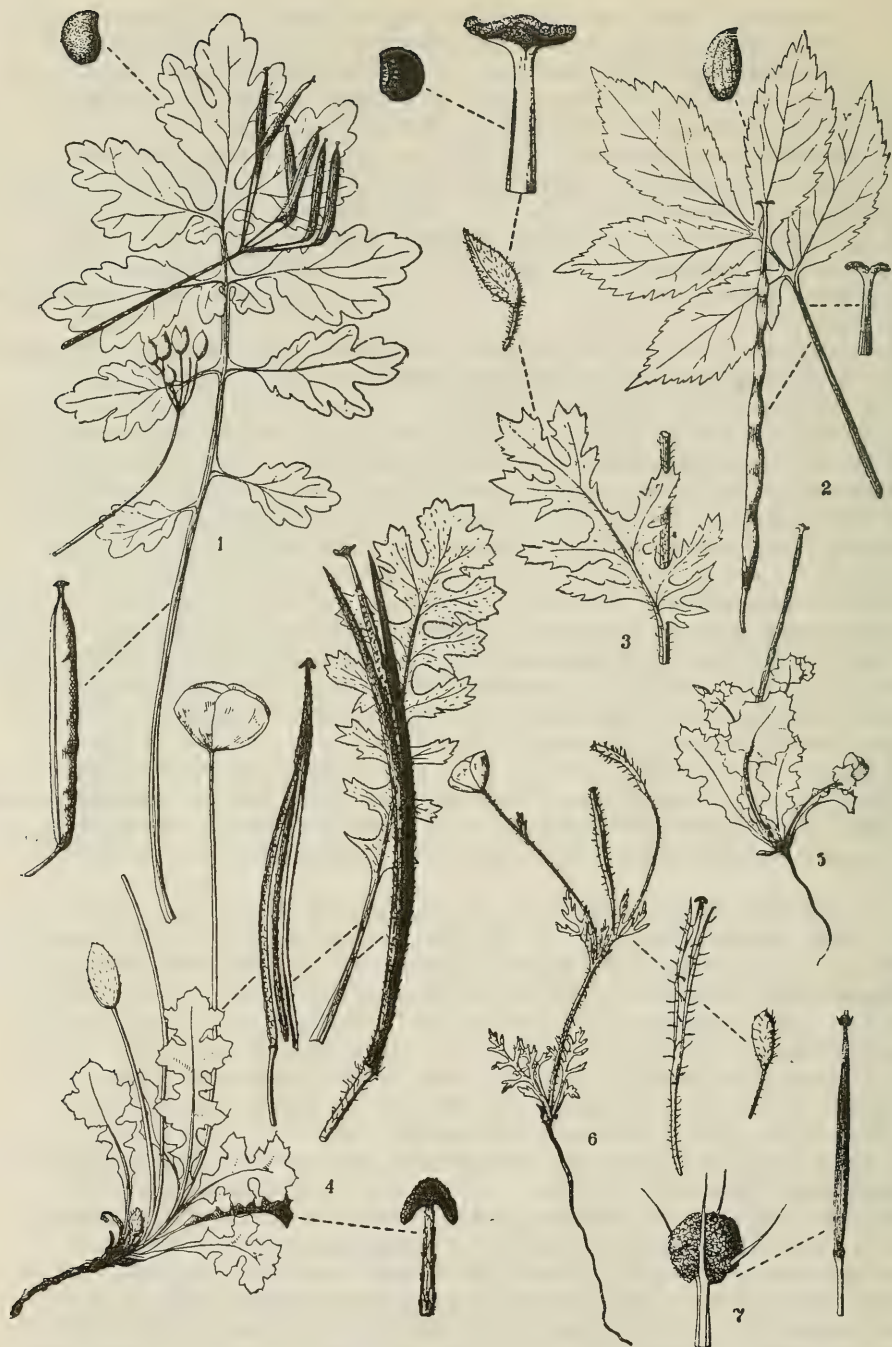


PLATE XL. 1—*Chelidonium majus* L.; 2—*Hylomecon vernalis* Maxim; 3—*Glaucium corniculatum* (L.) Curt. and leaves with silique in center of Plate referred to Figure 4; 4—*G.squami-gerum* Kar. et Kir.; 5—*G.bracteatum* M. Pop.; 6—*Roemeria hybrida* (L.) DC.; 7—*R.refracta* (L.) DC.

red with a blackish violet basal spot (*G. phoeniceum* Crantz, *G. corniculatum* Curt. s. str.), rarely brick-red with a black spot (*G. rubrum* Sibth. et Sm.) or the margin yellow, the middle red, with a black basal spot (*G. aureum* C. Koch var. *flaviflorum* DC.), black spot sometimes encircled by a white or yellow band (*G. tricolor* Bernh.); ovary densely white-villous; pedicels erect, thickish, up to 5 cm long; silique quite erect, upright, up to 25 cm long, 3–4 mm thick, immature siliques rather densely covered with semiappressed thin white hairs, mature siliques more or less bare; stigma low, 7 mm broad, with horizontal or ascending horns. April–June. (Plate XL, Figure 3).

Fields, weedy stony localities, roadsides slopes, and especially chalky slopes. — European part: U. V. (rarely), V. - Kama (rarely), V. - Don (rarely), U. Dnp., M. Dnp., Bl., L. - Don, Crim., L. V.: Caucasus: all, especially frequent in Transcaucasia; Centr. Asia: Mtn. Turkm. (Kopet Dag, seldom).

Gen. distr.: Centr. and Atl. Eur., Med., Bal. -As. Min., Arm. -Kurd., Iran. Described from Europe. Type in London.

Note. *G. phoeniceum* is most widely distributed in the west and north; *G. aureum* seldom occurs in the southwest; *G. tricolor* does not have a well defined area of distribution; *G. rubrum* has been reported from the northern Caucasus. Observation of the varieties of the [collective] species, would be very desirable, particularly in Transcaucasia.

3. *G. grandiflorum* Boiss., et Huet in Boiss., *Diagn. pl. nov. or.*, ser. 2, V (1856) 15; Boiss., *Fl. Or. I*, 121; N. Busch in *Fl. cauc. crit. III*, 4, 13; Fedde, l. c. 227. — Ic.: Fedde, l. c., fig. 28, 2—F. — Exs.: Kotschy, *Pl. Pers. aust. No. 311*.

Biennial, very close to preceding but larger in all parts, with denser and shorter pubescence; stems robust, 30–50 cm high, branching; radical leaves short-petioled, cauline leaves sessile, semiamplexicaul, pinnatisect; segments broad, broadly oblong, sharp-toothed. Flower buds oblong, villous, 2.5–4 cm long; petals broad, orbicular, 3–5 cm in diameter, orange or red in the center, with a blackish violet basal spot; pedicels short, erect, thickish; siliques pointing upward, 10–20 cm long, appressed white-hairy; stigma large, broad. April–June.

Dry stony slopes. — Caucasus: E. (Tbilisi, Kirovabad) and S. Transc. (Yerevan). **Gen. distr.:** Bal. -As. Min., Arm. -Kurd., Iran. Described from Erzerum. Type in Geneva.

Note. The limit between this species and *G. corniculatum* is as yet obscure. It must be determined by observations in Transcaucasia.

4. *G. oxylobum* Boiss. et Buhse in *Nouv. Mem. Soc. Nat. Moscou*, XII (1860) 12; Fedde, l. c., 234. — *G. pulchrum* Stapf in *Denkschrift. Akad. Wissensch. Wien*, LI (1886) 295; Fedde, l. c., 230. — *G. paucilobatum* Freyn in *Bull. Herb. Boiss.*, 2 sér., III (1903) 566. — *G. paucilobum* Fedde, l. c., 268. — Ic.: Boiss. et Buhse, l. c., tab. 5. — Exs.: *Sintensis*, *Iter transc.-pers. 1900–1901*, No. 7845; *H. F. A. M. No. 565*.

Biennial, very glaucous, sparingly pubescent plant; stem glabrous, often branching, 10–30 cm high, stout; radical leaves lyrate pinnatifid, with 2–3 pairs of triangular-ovate, obtuse, irregularly crenate lobes (*G. paucilobatum*) or up to 5 pairs of nearly regularly triangular, acute,

few-toothed lobes (*G. oxylobum*), margins and petioles slightly crisply villous; cauline leaves amplexicaul, oblong, medium-sized with lobed-margin; uppermost leaves crenate. Pedicels erect, 10 cm long; flower buds oblong, glabrous, acute, 1.5–3 cm long; petals wine-red with black spot in middle or at base, suborbicular, 1.5–3.5 in diameter; ovary glabrous or slightly torulose at summit; silique 15–20, up to 25 cm long, glabrous, slightly ribbed, erect, often slightly arcuate, slightly but visibly thickened at base (up to 6 mm thick, dehiscent from summit to base; stigma 7 mm wide; seeds brown, ca. 1.5 mm long. April–May.

Clayey and stony slopes in the semidesert zone.—Centr. Asia: Mtn. Turkm. (Western Kopet-Dagh). Gen. distr.: Iran. Described from the eastern end of the Elburz range in northwestern Iran. Type in Leningrad.

Note. Our Kopet Dagh plant was described as *G. paucilobatum* Freyn (type from the Ioldere Pass in Sumbar). It is distinguished from the type of *G. oxylobum* by less acute, broader, fewer leaf lobes and, apparently also, by the basal thickening of the silique.

5. *G. flavum* Crantz, Stirp. Austr. ed. 1, II (1763) 133; Shmal'g., Fl. I, 37; N. Busch in Fl. cauc. crit. III, 4, 14; Fedde, l. c. 232.—*G. luteum* Scop., Fl. Carn. ed. 2, I (1772) 369; Ldb., Fl. Ross. I, 92; Boiss., Fl. Or. I, 122; *Chelidonium glaucium* L., Sp. pl. (1753) 506.—Ic.: Rchb., l. c. Fl. Germ., tab. 4468, 4469.—Exs.: Fl. Gall. et Germ. No. 686.

Biennial; stems 20–50 cm high, glabrous, branching; leaves thickish, very glaucous; radical leaves large, densely pubescent with short crisp hairs, lyrate pinnatisect, often with approached overlapping lobes; lobes triangular to ovate, irregularly acutely dentate, teeth without mucro or with short mucro; terminal lobe broad but short, tetragonous-dentate, rarely lobes pinnatisect (*G. serpieryi* Heldr.); cauline leaves abundant; middle leaves large, similar to radical but sessile and more deeply and narrowly dissected; upper leaves amplexicaul, short, oval, entirely glabrous with subentire marginal lobes, rarely with acicular bristles along nerves. Flower buds glabrous or slightly acicular-setose, ovate-oblong, acute, 2–3 cm long; petals yellow, rarely orange and then with reddish or violet basal spot (*G. fulvum* Smith, *G. serpieryi* Heldr.), 1.5–3 cm in diameter; pedicels short, erect; ovary densely covered with white tubercles; siliques 15–25 cm long, erect or slightly arcuate, with remote white tubercles, sometimes glabrescent; stigma ca. 4 mm broad. May–July.

Rocky slopes, rarely in sand along the shores of the Black Sea.—European part: Crim. (often); Caucasus: Cisc. (Taman Peninsula), W. Transc. (often). Gen. distr.: Atl. and Centr. Eur., Med., Bal.-As. Min. Described from Europe. Type in London.

* 6. *G. leiocarpum* Boiss., Fl. Or. I (1867) 122; N. Busch in Fl. cauc. crit. III, 4, 14, Fedde, l. c., 234.

Biennials, similar to preceding species but stems more profusely branching, thinner, whitish; radical leaves markedly less pubescent, not as sharply distinguished from upper cauline leaves; lobes more acutely dentate; teeth produced into long bristle, cauline leaves smaller, with obtuse, sharp-toothed lobes. Flower buds slightly smaller and narrower; petals reddish orange or yellow, with brown basal spot; ovary slightly tuberculate or glabrous distally; siliques slender, slightly moniliform, entirely glabrous, 10–15 cm long. June–July.

Stony slopes. — Not yet found in the USSR; known from adjacent parts of Turkey (former Artvin district). **Gen. distr.:** E. Med., Bal.-As. Min., Iran., Arm.-Kurd. Described from Asia Minor. Type in Geneva.

Note. Fedde's record of this species from Turkmenia is incorrect.

7. *G. fimbrilligerum* Boiss., Fl. Or. I (1867) 120; Fedde, l.c., 228. — *G. luteum* var. *fimbrillifera* Trautv. in Bull. Soc. Nat. Mosc. XXXIII, 2 (1860) 92. — *G. fimbrilliferum* B. Fedtsch. in A. H. P. XXIII (1904) 366. — *G. vitellinum* B. Fedtsch., l.c., 366 (in clave) et 367. — Ic.: Fedde, l.c., fig. 29. A—B.—Exs.: H. F. A. M. No. 564.

Biennial; stems herbaceous, 30–60 cm high, branching, robust; radical leaves in large rosette, glabrous or slightly long-crisp-villous, lyrate pinnatisect, lateral lobes triangular-ovate, irregularly broad-angular, acutish, terminal lobe subtetragonal; cauline leaves rather numerous, semiamplexicaul, small, oval, acutely lobed, with teeth produced into long bristle; pedicels long, often 10–25 cm, erect, robust, thick. Flower buds oblong-ovate, acute, 1.5–2.5 cm long, glabrous or covered with acicular bristles; petals often yellow, without spot, large, delicate, 2.5 cm in diameter; siliques up to 5 mm broad, to 25 cm long, erect, often slightly arcuate, covered with sparse, acicular, appressed bristles (var. *typicum* m.) or glabrous (var. *leiocarpum* m.), dehiscent from summit to base; stigma large, up to 9 mm broad, with horizontal horns. April–June.

Bare loess or clayey bluffs, stony slopes, pebbly riverbeds in middle and lower mountain belt. — Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. **Gen. distr.:** Iran (Afghanistan). Described from Upper Zeravshan. Type in Geneva.

8. *G. squamigerum* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 141; Ldb., Fl. Ross. I, 744; Kryl., Fl. Zap. Sib. VI, 1232; Fedde, l.c., 228. — Ic.: Gartenfl. XXVIII, tab. 972; Fedde, l.c., fig. 29, C–D–E.

Biennial or perennial; stems several, from radical rosette, subramose, 20–40 cm high; stem base, radical leaves and pedicels covered with sparse slightly acicular-laminate squamules, sometimes plant subglabrous; radical leaves up to 10 cm long, lyrate pinnatisect, with triangular to ovate, irregularly angled lateral lobes, hispid-cuspidate along acute angles, glaucous, broad, sometimes slightly runcinate; terminal lobe obovate-tetragonal; cauline leaves 1 or 2, at middle of stem, minute inconspicuous, usually deeply incised, with acute segments; pedicels up to 20 cm long. Flower buds covered with spinous-squamose papillae or glabrous, oblong-ovate, acute, ca. 1.5 cm long; petals pale yellow, sometimes with white spot in the middle, 1.5–2 cm long, siliques erect or slightly arcuate, 10–15 cm long, 2–3 mm broad dehiscent from base to summit, bearing laminate spinous papillae; stigma relatively large, 3–4 mm wide. May–August. (Plate XL, Figure 4).

Bare clayey bluffs, pebbly slopes, and stony taluses of pebbly riverbeds in the upper mountain belt (especially in the forest and subalpine zones). — Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. (rarely). **Gen. distr.:** Dzu.-Kash. Described from Dzungarian Ala-Tau. Type in Leningrad.

9. *G. elegans* Fisch. et Mey. in Ind. Sem. Horti Petrop. I (1835) 29; Ldb., Fl. Ross. I, 93; Boiss., Fl. Or. I, 120; N. Busch in Fl. cauc.

crit. III, 4, 13; Fedde, l. c., 230. — *G. pumilum* Boiss., in Ann. Sc. Nat., 2 sér. XVI (1841) 374. — *G. tenue* Rgl. et Schmalh. in Rgl. Descr. pl. nov. Fedtschenk. (1882) 2. — Exs.: H. F. A. M. No. 563.

595 Annual, entire glaucous plant; stem slender, 8–30 cm high, from middle, rarely almost dichotomously branching from base; radical leaves forming a small rosette, with margin and petioles crisp-villous, lyrate-pinnatilobate or pinnatisect; lateral lobes oblong or irregularly ovate-triangular, angular-crenate or incised; terminal lobe obovate, entire or 3-lobed; cauline leaves amplexicaul small, irregularly lobed-incised or subentire (*G. tenue*); teeth short, produced into awns; leaflets on lateral branches small, inconspicuous, not opposite and not approached to flowers. Flower buds narrowly oblong, acute, 1–2 cm long, glabrous or with short, aculeate papillae; petals obovate, yellow, red in middle part (sometimes almost entirely red), with oblong black basal spot; pedicels short, upright; siliques thin, often arcuate or irregularly twisted at apex, 6–10, rarely up to 15 cm, ca. 2 mm wide, dehiscent from base to apex, rarely glabrous (*G. tenue*), often covered with slightly aculeate laminate papillae; stigma 1.5 mm broad, small (smallest in the genus), with downward directed sub-orbicular horns; seeds black, ca. 1.2 mm long, suberect, reticulate-alveolate, with transversely elongated alveoli. April–May.

Stony woodless slopes in lower mountain zone. — Caucasus: Dag. (southern), E. and S. Transc.; Centr. Asia: T. Sh. (from the Ili River in the east), Pam. -Al. (all), Mtn. Turkm. Gen. distr.: Iran., Arm. -Kurd., Dzu. -Kash. Described from Northern Iran. Type in Leningrad.

10. *G. bracteatum* M. Pop. in Sched. ad H. F. A. M. XXIII (1934) 79. — Exs. — l. c. No. 562.

Annual, glaucous, slightly crisply pubescent (with flattened villi) particularly along leaf margins and midrib; stem erect, 2–10 cm, simple or slightly branching; radical leaves pinnate-lyrate incised; lobes triangular, irregularly crenate-dentate, reduced below; terminal lobe broader, subtetragonous; cauline leaves amplexicaul, rounded-oval, obtuse, not deeply lobed and strongly-toothed; teeth produced into awn, corolla minute [sic!]; lateral flowers axillary with 2 bracts at base; bracts opposite, similar to reduced cauline leaves, dentate-crenate. Flower buds ca. 8 mm long, oblong-fusiform, pointed; petals 6–9 mm long, obovate, orbicular or slightly dentate at apex, yellow, red inside, with a basal black oblong spot; silique almost sessile, erect, up to 9–10 cm long, thin, glabrescent, with solitary scattered prickly short squamules dehiscent from base to summit; stigma small, broader than long, with horizontal horns. May. (Plate XL, Figure 5).

Gypsiferous clayey slopes in low mountain zone. — Centr. Asia: Pam. -Al. (Chulbair mountains near the villages of Khodzha-Ipak — Vvedenskii). Endemic. Described from the above mentioned localities. Type in Leningrad and Tashkent.

Annual herbs, with bristly pubescence. Milky juice yellow, thick. Leaves bipinnatisect into linear lobes. Flower stalks elongated, axillary and terminal, 1-flowered; corolla red or violet; stamens numerous, with filiform filaments and oval anthers; ovary 2–6-merous; stigma rays not united by scarious membrane, slightly inclined; fruit stalks often recurved; capsule siliquiform, cylindrical, not flattened, thin, dehiscing from apex to base along the placental cords by (2–) 3–4 (5–6) valves; placentas filiform, separating from valves and stigma; seeds gray or black, reticulate-pitted.

1. Flowers dark violet. Capsule with spreading bristles or glabrous; valves not awn-pointed above stigma 1. *R. hybrida* (L.) DC..
- + Flowers bright red, petals with basal black spot. Capsule glabrous or appressed-hispid, valves awn-pointed above stigma
- 2. *R. refracta* (Stev.) DC.

1. *R. hybrida* (L.) DC., Syst. II (1821) 92; Ldb., Fl. Ross. I, 92; Boiss., Fl. Or. I, 118; Fedde, l. c., 239.—*Chelidonium hybridum* L., Sp. pl. (1753) 506.—*C. dodecandrum* Forsk., Fl. Aeg.-Arab. (1775) 100.—*Roemeria violacea* Med. in Usteri, Ann. Bot. III (1792) 15.—*R. orientalis* Boiss. in Ann. Sc. Nat., 2 sér., XVI (1841) 374.—*R. dodecandra* Stapf in Denkschr. Acad. Wien LI (1886) 275; Fedde, l. c., 242.—Ic.: Sibth. et Sm., Fl. graeca, tab. 490.

Annual; stem 5–50 cm high, rarely simple, often divaricately branched, with soft white or spreading-hispid hairs, rarely glabrescent, slightly nodose, usually upright; radical leaves petioled, cauline leaves sessile; lamina of radical leaves often 2-, rarely 1-pinnatisect, with oblong or lanceolate or linear, obtuse, involute lobes terminating in a bristle; leaves sparingly hairy or bristly; cauline leaves tripartite, their segments 1- or 2-pinnatisect into lanceolate or linear lobes. Flower buds oval-oblong, narrow, obtuse, 8–13 mm long, sparsely covered with bristly hairs; petals dark violet, obovate, 10–25 mm long; pedicel short, usually 1–5 cm, not more than 8 cm, upright or curved, thin or thickened; stamens few, with black filiform filaments and small oblong azure anthers; capsule linear-cylindrical, 2–10 cm long, as thick as or thicker than fruit stalks, tapering slightly toward apex or cylindrical, glabrous, with spreading setae at apex or along entire length, sometimes also with small bristles below sutures or over entire surface of valves, erect or slightly arcuate, dehiscing by 2, more often 3–4 valves which are not awn-pointed, longer than the stigma but with a short liguliform appendage bearing a group of approximate bristles; seeds gray, reniform, ca. 1 mm long, reticulate-alveolate, with isodiametric alveolae. April–May. (Plate XL, Figure 6).

Stony and sandy deserts: slopes of foothills.—European part: Crim.; Caucasus: Dag., E. and S. Transc.; Centr. Asia; southern regions. Gen. distr.: Med., Bal.-As. Min., Centr. and Atl. Eur. (rarely), Arm.-Kurd., Iran., Dzu.-Kash. Described from southern Europe. Type in London.

* After J. Roemer, physician, naturalist, and author of some very important botanical works, who lived in Zürich from 1763–1819.

Note. A very polymorphous, collective species which can only be properly divided by a detailed analysis of samples grown under cultivation. The species most often recognized is *R. orientalis* Boiss., which is ecologically linked with the desert areas of the range of the entire group, e.g., deserts of lower Egypt, Sinai, Southern Iran, and the Aral area. Its characters are as follows: low growth; leaf lobes short, broad, oblong; corolla small; capsule short, thick, distinctly thicker than fruit stalks, entirely covered with bristles. We have not separated it because *R. orientalis* from Turkestan, for example, more closely resembles the Turkestan *R. hybrida* in its long- and short-bristled capsule, which is generally typical of the Turkestan (and Apsheron) *Roemeria*, but does not occur in the Egyptian, European, and Asia Minor plants.

2. *R. refracta* (Stev.) DC., Syst. II (1821) 93; Ldb., Fl. Ross. I, 92; Fedde, l. c. 243. — *R. rhoeadiflora* Boiss., Diagn. pl. nov. or sér. I, VI (1855) 7; Boiss., Fl. Or. I, 119; N. Busch in Fl. cauc. crit. III, 4, 19. — *R. bicolor* Rgl. in Bull. Soc. Nat. Mosc. XLIII, 1 (1870). 249. — *Claucium refrectum* Stev. ex DC., l. c. — Ic.: Deless., Pl. select. II, tab. 8.

598 Annual; stem 10–60 cm high (often 20–40 cm), rarely simple, more often with loosely spreading branches, angular-orbicular, with soft white or bristly hairs, rarely glabrescent, upright; leaves large, radical and lower cauline leaves petioled, upper leaves sessile, sparingly hairy, 2–3-pinnatisect into oblong or lanceolate or linear, obtuse, sometimes slightly bristly lobes. Flower buds oval or ovate, glabrous or hispid, large, up to 2 cm long; corolla bright red; petals broad, orbicular-flabelliform, 1.5–4 cm in diameter, with basal black spot sometimes white-margined distally; pedicels usually elongated, 5–15 cm long, fruiting pedicels erect, usually recurved; siliques thin, 3–10 cm long, 2–4 mm broad, attenuate, erect, often smooth, rarely appressed-hispid, dehiscing by 3–4 (rarely 2 or 5–6) mucronate valves longer than the stigma; stamens numerous, filaments slender, black, anthers oblong, brownish yellow; seeds gray, alveolate-reticulate, reniform. April–May. (Plate XL, Figure 6).

Fields, gardens, and clayey slopes of foothills. — Caucasus: Dag., S. and E. Transc., Tal.; Centr. Asia; Balkh., Dzu.-Tarb., T. Sh., Syr D., Pam.-Al., Amu-D., Mtn. Turkm. Gen. distr.: Dzu.-Kash., Iran., Arm.-Kurd. Described from Dagestan (Derbent): Type in Geneva.

Genus 556. **PAPAYER** * L.

L. Gen. pl. ed. 1 (1737) 150; Fedde in Pflanzenr. IV, 104 (1909) 288.

Milky juice white or yellow or orange. Flowers singly on long pedicels or (in stemless species) on stalks, ebracteate, in some species inflorescence paniculate; stamens usually numerous, with slender or clavately expanded filaments above; anthers orbicular to linear, rarely with capitate appendage on connective; pistil of 3–22 mostly 4–10 carpels; capsule short-cylindrical, clavate, oblong or obovate or globular, sessile or abruptly tapering into a

* From the Latin name for poppy, referring to its soporific nature.

short pedicel, 1-celled; placentas developed as slender [radial] laminae; capsule covered by a pyramidal convex or flat disk, rays opposite placentas usually united by a scarious or coriaceous membrane into a continuous disk. Capsules dehiscent by pores immediately below disk. Seeds small, alveolate-reticulate, without appendage. Annual, biennial or perennial herbs, usually with stems, rarely stemless. Leaves usually 1- or 2-3-pinnatisect, usually hairy-bristly, or glabrous.

Economic importance. The genus *Papaver* includes some interesting species of practical value. *P. somniferum*, the opium poppy, is one of the more important of these. It is cultivated as the source of opium — it contains the alkaloids, morphine and codeine, used for medicinal purposes — or, in the more northern regions, for its oily seeds. The seeds are mainly used in confectionery. In the USSR, the opium poppy is grown mainly in southern Kazakhstan and Kirgizia, particularly in the Alma-Ata, Karakol, and Kopal regions. It is also grown to a small extent in the Ussuri area in the Far East. Oleaginous poppy is of less importance. The alkaloids of opium are found in some wild poppies, for example, in the roots of species of section *Scapiflora*.

599 Other species of *Papaver* are favorite ornamental and garden plants. These are included in the variegated garden species of section *Oxytona*, with their enormous, usually bright flowers; further there is *P. rhoeas*, whose garden forms are even more richly variegated; the ornamental races of *P. somniferum* and *P. nudicaule* are also very common in the northern regions of the USSR.

Key to Sections

- 1. Perennial (even if monocarpic) or, at least, distinctly biennial plants, with very conspicuous rosettes of radical leaves and more or less robust rootstock 2.
- + Distinctly annual plant, with slender rootstock. Petals never yellow, usually red with variegated black spot (or albino) 5.
- 2. Plants stemless. Flowers borne singly on long peduncles overtopping the leaves. Corolla white, whitish pink, yellow, or orange, always without black or dark spot. Disk of bristly capsule usually poorly defined, without scarious extension uniting the rays, as broad as capsule, capsules rarely glabrous, but if so then scarious extension of rays well developed (p. 458). Section 1. **Scapiflora** Rchb.
- + Stems — with the exception of one species (*P. monanthum*) — developed just as in *Scapiflora*; the capsule of *P. monanthum* is glabrous, with a scarious disk bearing rigid bristles; there are no rufous hairs on peduncles and buds. Grows in the Caucasus 3.
- 3. Petals pink or orange-red or pinkish red, always without black spot. Filaments yellow, slender, filiform throughout. 4.
- + Petals bright red or densely pinkish red, often (but not always) without black spot, very large, up to 8 cm long, filaments slightly thickened distally. Tall perennials, usually with strongly developed stems, strongly bristly. Stems few-branched, often 1-flowered. Capsules large, ovate-rounded. Disk flat, scarious (p. 470) Section 2. **Oxytona** Bernh.

4. Disk somewhat convex or flat, scarcely narrower than capsule. Flowers borne singly on long peduncles of terminal branches or (in the stemless *P. monanthum*) on long peduncles. Capsules glabrous, obovate or oblong-clavate. Perennials (p. 474) Section 3. **Pseudo-pilosa** M. Pop.
- + Disk small, narrow, pyramidal, 4–6-rayed, much narrower than the capsule. Flowers numerous, in racemiform-paniculate inflorescences overtopping the stem. Biennials (p. 475) Section 4. **Milthantha** Bernh.
5. Capsules with rigid bristles (very rarely glabrous). Disk always small, convex, its rays ascending, pectinate, united by a rigid coriaceous membrane. Filaments usually clavately thickened distally (p. 479) Section 5. **Argemonorhoeades** Fedde.
- + Capsules glabrous 6.
6. Stigmatic rays pectinately ascending, united by a rigid scarious membraneous margin, their tips recurved onto the capsule. At maturation the entire disk readily falling off as an operculum. Anthers black, suborbicular, the connective bearing a small yellow globular appendage (p. 484). Section 6. **Carinata** Fedde.
- + Disk flat, scarious; the tips of the rays recurved only in the young capsule; rays developed as scarcely elevated papillary lines, not ascending 7.
7. Cauline leaves not amplexicaul (rarely amplexicaul, in other species, not growing in the USSR), more dissected. Filaments slender, filiform. Basic chromosomal number 7 (p. 484) Section 7. **Orthorhoeades** Fedde.
- + Cauline leaves amplexicaul, subentire. Filaments clavately expanded above middle. Basic chromosomal number 11. — Larger herbs (p. 492) Section 8. **Mecones** Bernh.

Section 1. **SCAPIFLORA** Rchb., Fl. Germ. excurs. (1832) 700; Fedde in Pflanzenr. IV, 104 (1909) 366. — *Lasiotrachyphylla* Bernh. in Linnaea VIII (1833) 463. — Stems very reduced, simple or more or less branching, resembling the branches of the rootstock, creeping or cespitose; peduncles long, longer than the leaves, 1-flowered; leaves all radical, petiolate; capsules oval, orbicular, oblong or clavate, often setose, rarely glabrous. Disk of the setose capsules without or nearly without scarious extension of rays, poorly developed, as broad as capsule; disk of the glabrous capsules scarious; petals most often yellow, yellowish orange, rarely white or whitish pink or orange-red, never with black or violet spot (sometimes base of petal turns dark blue upon drying, imitating a black spot). — Plants of the alpine mountain zones or the Arctic, in eastern Siberia also meadow and even steppe plants.

All the species described below, except *P. lisae*, have occasionally been recognized as subspecies and varieties of *P. nudicaule* L. s. l. (for example, by Ledebour, Busch and Fedde). But only recently — starting with Lundström — have the more outstanding types of this collective species been recognized as separate small species. A. I. Tolmachev was especially successful in selecting the outstanding types from Siberia. It must be borne in mind that his descriptions, as well as of those small species do not

601 provide clear-cut morphological boundaries between related species, for especially where several such small species grow together there are numerous transitional forms between them. Thus we may consider these species as newly-originating, rather than as already formed, and in describing them as species we shall actually be anticipating nature. In spite of this, however, it would serve no purpose to return to the meaningless *P. nudicaule* L. s. l., because thereby all the results of studies on the varieties of this species would be lost. In any case, those who have been unsuccessful in determining precisely the small species, due to lack of specimens or because they have a type that is transitional among some species, may refer to *P. nudicaule* L. s. l. in the same way as one refers to *Artemisia maritima* L. s. l. and *Euphrasia officinalis* L., s. l. thereby giving a more precise indication than the plain generic designation: *Papaver* or *Artemisia*.

1. Low-growing plants of the alpine mountain zone or the Arctic, 5–15, rarely up to 20–30 cm high. In many species milky juice yellow. Flower buds usually densely dark-hairy 2.
- + Much taller plants, 20–60 cm high 11.
2. Corolla orange, yellowish orange or orange-red, not pure yellow . . . 3.
- + Corolla pure yellow or white or whitish pink, rarely orange (some specimens of *P. angustifolium*) 4.
3. Corolla minute, ca. 2 cm in diameter, long persistent after flowering, enclosing capsule. Peduncles much longer, up to 40 cm. In the Pamirs or the alpine zone 14. *P. involucreatum* M. Pop.
- + Corolla 2–3.5 cm in diameter, soon deciduous. Peduncles 10–20 cm. Anadyr, Kamchatka 12. *P. microcarpum* DC.
- + Corolla 3–4 cm in diameter caducous. Peduncles 5–15 cm. Alpine zone, Tien Shan, and southern Altai 15. *P. tianschanicum* M. Pop.
4. Leaves bipinnate, subglabrous 23. *P. nivale* — A. Tolm.
- + Leaves simple-pinnate, more or less villous 5.
5. Corolla white-pink. Peduncles short. Kamchatka 13. *P. alboroseum* Hulten.
- + Corolla yellow, rarely white or whitish pink 6.
6. Flower stalks with spreading hairs, dark rufous above. Flower buds densely covered with black hairs 7.
- + Peduncles often appressed and moderately dark, sometimes all gray. Flower buds less black-hairy 8.
7. Stamens few, barely longer than ovary. Anthers oval-rounded. Arctic 18. *P. radiculatum* Rottb.
- + Stamens numerous, markedly longer than ovary. Anthers oblong-linear. Alpine zone of Altai and Sayans 17. *P. pseudocanescens* M. Pop.
8. Leaf segments narrow, linear, elongated, extended. Corolla ca. 3 cm across. Capsule graceful, clavate, tapering at base into a pedicel. Lower reaches of Yenisei 20. *P. angustifolium* A. Tolm.
- + Leaf segments broader, not narrowly linear, capsule broad, not tapering at base into a pedicel. Corolla slightly larger 9.

9. Plants stocky, 10–12–15 cm tall, gray, densely cespitose 10.
 + Plants taller, up to 30 cm. Capsules more elongated, averaging
 13 mm in length. Kola Peninsula 21. *P. lapponicum* Nordh.
10. Arctic region, lower reaches of Yenisei . . . 19. *M. pulvinatum* A. Tolm.
 + Alpine zone of Tarbagatai 16. *P. canescens* A. Tolm.
11. Capsules glabrous (or glabrescent), with solitary bristles 12.
 + Capsules with bristles 16.
12. Disk scarious; rays and scarious extension of the margin very
 well defined 13.
 + Scarious extension of rays very weakly developed or obsolete
 Transbaikalia 3. *P. leiocarpum* Turcz.
13. Capsules small, ca. 10 mm long, very beautiful, narrow. Peduncles
 slender. Leaves small. Flowers ca. 3 cm in diameter 14.
 + Capsules usually larger or large, up to 23 mm long, thick. Peduncles
 thick, leaves large. Flowers larger, 6–8 cm in diameter 15.
14. Capsule entirely glabrous. Disk without central mucro
 4. *P. stubendorffii* A. Tolm.
 + Capsule with solitary bristles. Disk pointed
 5. *P. pseudo-stubendorffii* M. Pop.
15. Rudiments of stems 1–3 cm long. Capsule very large, to 23 mm long.
 Leaves glabrescent. Disk pyramidally ascending. Northern
 Caucasus 1. *P. lisae* N. Busch.
 + Quite stemless. Leaves and peduncles bristly. Capsule smaller,
 16–17 mm long. Disk flat. Amur, Ussuri . . . 2. *P. anomalum* Fedde.
16. Flower buds densely covered with silk hairs, white. Leaves gray,
 appressed-hairy. Xerophilous poppies of Dauria and Northern
 Mongolia 17.
 + Flower buds with gray or rufous pubescence or bristles not densely
 covered with long silky hairs 18.
- 603 17. Corolla orange-red 8. *P. rubro-aurantiacum* Lundstr.
 + Corolla yellow 9. *P. ledebourianum* Lundstr.
18. Corolla pure yellow 19
 + Corolla orange, fresh or dried 20
19. Glabrous plant. Corolla small, ca. 2 cm across. Stems slender. . .
 6. *P. tenellum* A. Tolm.
 + Bristly plant. Corolla large, 4–6 cm in diameter. Peduncles stout
 7. *P. nudicaule* L.
20. Flower buds with rufous pubescence as in *P. nudicaule* rarely
 gray. Leaf segments usually dentate or lobate. Tien Shan, Altai,
 Sayans 10. *P. croceum* Ldb.
 + Pubescence of bud of short white hairs. Leaves glabrescent. Ayan coast
 *P. ajanense* M. Pop.

1. *P. lisae* N. Busch in Trav. Mus. Bot. Ac. Sc. XIX (1926) 82.—
P. oreophilum v. *monanthum* f. *obtusifolium* N. Busch in Fl.
 cauc. crit. III, 4 (1905) 45.—Ic.: l. c., tab. IX.

Perennial; stemless or often with reduced stems, 1–3 cm long; leaves
 glabrescent, green, up to 15 cm long; petioles and underside of nerves with a
 crisp, rufous-white setose inconspicuous pubescence; petioles rarely slender,
 often expanded, flattish, slender, entirely deciduous; blade as long as or
 shorter, rarely longer than the petioles, oblong or ovate, 1-pinnate, lower
 pair of segments more or less drawn back, the remaining 3–5 pairs
 overlapping and confluent with base; segments large, ovate or oblong, large-

crenate, rarely entire, obtuse or subobtuse, rarely acute. Peduncles upright, large, thickish, 25–35 cm high, glabrous beneath, with rufous, nearly black bristles; corolla large, 6–8 cm in diameter, orange-pink; petals caducous, broad, overlapping, undulant-dentate at front of margin; stamens numerous, borne on a broad belt, filaments yellow, anthers linear, scarcely overtopping the stigma; capsules glabrous, glaucescent, up to 23 mm long, oblong-clavate, with thick placental nerves and an obscure network of lateral nerves; disk small, pyramidally ascending, with broad, coriaceous, scarious-margined rays; rays 5–7, low, seeds reticulate-alveolate, alveoli with bladdery-inflated epidermis. July–August.

Stones and grass plots in alpine zone, 2,000–2,500 m. — Caucasus: Cisc. (eastern part: Balkariya, Skalistyi Range, Sukan River). Endemic. Described from the Rtsyvashka glacier. Type in Leningrad.

604 Note. Together with the Caucasian, *P. monanthum*, this species provides a link between the groups *Scapiflora* and *Pseudo-pilosa*. In most of its characters *P. monanthum* suggests *Pseudo-pilosa*, while *P. lisae* is closer to *Scapiflora*, from which it is distinguished mainly by the presence of a short, but visible stem.

2. *P. anomalum* Fedde in Engl., Pflzreich. IV, 104 (1909) 384. — *P. nudicaule* subsp. *amurense* N. Busch in Fl. Sib. i Dal'n. Vost. 1 (1913) 21.

Perennial, small-tufted plant; leaves elongated, usually simple pinnatifid (lobate) or pinnatisect; lobes (segments) entire, narrow, obtuse, sometimes broader, lobate-dentate, obtuse; peduncles erect, long, 25–60 cm. Flower buds ovate, large, sparingly pubescent, corolla white, rarely yellow or orange, large, 6–7 cm in diameter; capsules glabrous, cylindrical, clavate or ovate or subglobular, small or large, with a quite flat disk; scarious extension of rays broadly fused, conspicuous. June–August.

River valleys, dry slopes, elevated ridges among meadows, and cultivated fields. — Far East: Uss., Uda. Gen. distr.: Ja.-Ch. (northeastern China). Described from Hupeh Province, Wilson No. 2421. Type in Berlin, cotype in Leningrad.

Note. *P. anomalum* has been described with a subspherical capsule and orange petals — such as are sometimes encountered in Amur; more often the capsules are elongated and the flowers white.*

3. *P. leiocarpum* Turcz. in Bull. Soc. Nat. Mosc. (1838) 86. — ? *P. miniatum* Rchb., Pl. crit. VIII (1830) tab. 746 No. 989.

Perennial; leaves of medium length; petioles much longer than blades; blade ovate or oblong, pinnatisect; segments rather approximate, of the 2–4 pairs the lower slightly drawn back, linear or lanceolate, acute, elongated, entire or (rarely) 2–3-lobed or dentate; pubescence of few appressed bristles, making leaves glabrescent; peduncles numerous, 20–40 cm long, slender, 2–4 times longer than leaves, glabrescent, with few appressed bristles, rufous only at top of stem. Flower buds oval, slightly longer than 10 mm, with a short, dense, slightly spreading dark pubescence; corolla medium large, 3–4 cm in diameter, yellow (or orange?), caducous;

* It is highly improbable that *P. anomalum* Fedde and *P. nudicaule* subsp. *amurense* N. Busch are identical. It is more accurate to consider them as two different species. V. Komarov.

605 filaments numerous, darkening, anthers linear; capsule glabrous, gracefully clavate, distinctly tapering at base, 11–13 mm long; disk pyramidally ascending, submucronate in the middle; rays extended on sutures; scarious extensions between rays absent or nearly absent. June–July.

Rocks. — E. Siberia: Ang. - Say. Endemic. Described from Bugusona stream (subalpine zone). Type in Leningrad.

Note. *P. leiocarpum* is close to *P. stubendorffii* in its appearance, slender long peduncles, small glabrescent leaves and glabrous capsule. It appears to differ by yellow, not orange, larger flowers. It differs from *P. ajanense* by having glabrous, not bristly capsules and, probably, yellow flowers.

4. *P. stubendorffii* A. Tolm. in Journ. Bot. de l'URSS, XVI (1931) 80. — Ic.: 1. c., p. 2.

Perennial, cespitose, small, loose; petioles long, slender, delicate, with sparse bristles; leaves short, up to 8 cm, delicate, glabrous or with sparse white bristles, simple or nearly 2-sect; segments separate, oblong or oblong-linear, obtuse, entire or the lower incised-lobate, lower segments petiolate; peduncles very slender, erect, 20–40 cm long, 3–5 times longer than leaves, sparingly pubescent, glabrescent. Flower buds oblong-oval, small, ca. 10 mm long, with spreading, sparse, rufous bristles; corolla caducous, ca. 3 cm in diameter; petals orange (when dry); stamens numerous, 1.5 times as long as the corolla; capsules small, graceful, clavate, obconical, ca. 10 mm long, glabrous; disk weakly pyramidally ascending, rarely slightly convex, scarious extension of rays almost entirely fused. June–July.

E. Siberia: Lena-Kol. Endemic. Described from Stubendorff specimens collected near the Allakh-Yun River. Type in Leningrad.

Note. A very characteristic species, with a distinct distribution area (between the Maya and Okhota rivers). — *P. miniatum* Rchb., described from Siberia (exact location unknown), is most similar to *P. stubendorffii*; it also has orange leaves and a glabrous capsule. However, it may be identical with *P. leiocarpum* Turcz., which, judging by the type specimen, may also have orange petals. If this is so, it is distinguished from *P. stubendorffii* only by a large capsule and a disk without fused scarious extensions of the rays.

5. *P. pseudo-stubendorffii* M. Pop., sp. nova in Addenda VI, p. 577.

Perennial; all characters of leaves, peduncles and flowers similar to *P. stubendorffii*, except for the capsule, which has few, solitary bristles and a centrally raised more or less long-cuspidate disk; capsule 8–10 mm long, similar in shape to *P. stubendorffii*. June–August.

E. Siberia: Lena-Kol. Endemic. Described from the Aldan River. Type in Leningrad.

606 6. *P. tenellum* A. Tolm. in Svensk. Bot. Tidskrift, B. 24 (1930) 40. — Ic.: 1. c., 40, fig. 3.

Perennial, glabrous, compactly tufted small plant; leaves glabrous, 2–3 times the length of the stem, up to 15 cm long; blades small, slender, nearly bipinnatisect, glaucescent, rarely pinnate; segments or lobes oblong or oblong-linear, obtuse or acute; peduncles slender, erect, with sparse,

antrorsely appressed bristles. Flower buds obovate, subglobular, less than 10 cm in diameter, with sparse bristles; corolla yellow or white, small, ca. 2 cm in diameter; capsule appressed-bristly, small.

Shady ravines. — W. Siberia: Irt. (Karkaralinsk Mountains). Endemic. Described from the Karkaralinsk Mountains. Type in Leningrad.

7. *P. nudicaule* L., Sp. pl. (1753) 507; Lundstr. in Acta Horti Berg. VII (1923) 419; Kryl., Fl. Zap. Sib. VI, 1935. — *P. nudicaule* ssp. commune N. Busch in Fl. Sib. i Dal'n. Vost. I, 20 ex p.

Perennial, small-tufted plant; leaves long, pinnate, greenish, rarely grayish, spreading-hairy, gray, segments oblong or lanceolate, rarely linear, simple or rarely dentate; flower stalks slightly appressed or spreading-bristly, 15–50 cm long, strong, erect. Flower buds rather large, 4–6 cm in diameter, corolla yellow, caducous; filaments long, numerous; capsules bristly with white or rufous, appressed setae, rather large, narrowly clavate or more broadly oblong; disk slightly convex, rays without scarious margins, almost without scarious membrane in the angles between them. June–August.

Stony slopes, river gravels, sandy meadows, and sometimes steppes. — W. Siberia: Alt.; E. Siberia: Yenis., Ang.-Say., Dau., Lena-Kol.; Centr. Asia: Dzu.-Tarb. **Gen. distr.:** Mong. Described from Siberia. Type in London.

8. *P. rubro-aurantiacum* Fisch. ex Steud., Nom. II (1841) 266 nomen nudum; Lundstr. in Acta Horti Berg. VII (1923) 417 (descr.). — *P. nudicaule* var. *rubro-aurantiacum* Fisch. ex DC., Syst. II (1821) 70. — *P. nudicaule* γ *croceum* Ldb., Fl. Ross. I (1842) 87, p.p. — *P. rubro-aurantiacum* ssp. *typicum* A. Tolm. in Sv. Bot. Tidskr. B. 24 (1930) 38. — Ic.: Tolm., l.c., f. 2.

Perennial, small-tufted plant; leaves medium length, strongly canescent, with dense appressed bristles, pinnatisect, segments drawn apart, narrow, lance-linear, elongated, usually entire, rarely lower segments dentate, terminating in a long bristle; flower stalks long, 20–40 cm, erect, strong, 3 times as long as the leaves. Flower buds subglobular, almost entirely with white hair; hairs long, slender, appressed, dense, giving the buds a silky appearance; corolla of medium size, ca. 4 cm in diameter, caducous, orange or orange-red; capsule covered with appressed bristles. June–July.

Steppes and stony slopes. — E. Siberia: Dau. **Gen. distr.:** Mong. Described from Dauria. Type in Bergen.

Note. *P. rubro-aurantiacum* ssp. *setosum* A. Tolm., l.c., 39, with spreading-haired peduncles, presumably represents a cross between *P. nudicaule* with *P. rubro-aurantiacum*. Contrary to Tolmachev's view, *P. rubro-aurantiacum* was never geographically separated from the typical form.

9. *P. ledebourianum* Lundstr., l.c. (1923) 418 (excl. syn. *P. croceum* Ldb.).

This species is distinguished from *P. rubro-aurantiacum* only by its yellow petals. — E. Siberia: Dau. **Gen. distr.:** Mong. Described from Transbaikalia and Mongolia. Type in Bergen.

10. *P. croceum* Ldb., Fl. Alt. II (1830) 271; Kryl., Fl. Zap. Sib. VI, 1236. — *P. alpinum* var. *croceum* Ldb., Fl. Ross. I (1842) 87 p. p. — *P. nudicaule* ssp. *commune* var. *rubro-aurantiacum* N. Busch in Fl. Sib. i Dal'n. Vost. Boct. 1 (1913) 22, p. p. — *P. nudicaule* ssp. *rubro-aurantiacum* var. *trilobifolium*, *subcorydalifolium*, *corydalifolium* Fedde in Pflzreich, IV, 104 (1909) 381–382. — *P. nudicaule* ssp. *corydalifolium* N. Busch in Fl. Sib. i Dal'n. Vost., I (1913) 22. — Ic.: Ldb., Ic. Fl. Ross. t. 141. — Exs.: H. F. A. M. 566a and b.

Perennial, small tufted plant; leaves large, long-petioled, setose, weakly or strongly spreading, not appressed; segments 3 or 5, large, broad, 3 upper segments, approximate, ovate or oblong, capitate-lobate, rarely subentire; peduncles long, 15–50 cm, rather slender, glabrescent, with sparse appressed or spreading bristles, often rufous above. Flower buds oval, often large, more than 10 mm long, usually dark rufous, rarely white-bristled; corolla large, 4–6 cm in diameter, yellow or orange, (orange when dry); stamens numerous, much longer than ovary; capsule with appressed bristles, usually small, to 10 mm, rarely to 12 mm long, broadly or narrowly oval; disk convex; scarious extension of rays conspicuous or inconspicuous. June–August.

Stony slopes, meadows in the alpine zone, and bald mountains. — W. Siberia: Alt.; E. Siberia: Angl.-Say.; Centr. Asia: Pam.-Al., T. Sh., Dzu.-Tarb. Gen. distr.: Ind.-Him., Mong., Jap.-Ch. (northeastern China). Described from Altai. Type in Leningrad.

11. *P. ajanense* M. Pop., sp. nova in Addenda VI, p. 577.

608 Perennial, apparently forming rather large tufts; leaves of medium length, usually pinnatisect, with narrow entire lanceolate segments, rarely lower or many segments dissected into 2–4 simple lanceolate lobes; leaves sparingly covered with sparse white bristles, rarely (especially on petioles) more densely setose, peduncles upright, 15–30 cm long, strong, erect or slightly flexuous or arcuate, 2 to 3 times as long as the leaves, covered with appressed white hairs. Flower buds oval, slightly pubescent, bristles sparse, short, white; corolla of medium size, ca. 4 cm across, white-pink or pale orange; capsules narrow, clavate, 12–18 mm long, with densely appressed bristles; disk slightly convex; scarious extensions of rays nearly absent, rarely scarious stripes along the rays.

Far East; Uda. Endemic. Described from Ukoi Bay. Type in Leningrad.

12. *P. microcarpum* DC., Syst. II (1821) 71; Kom., Fl. Kamch. II, 157; Hultén, Fl. of Kamtch. II, 141. — *P. alpinum* var. *microcarpum* Ldb., Fl. Ross. I (1842) 87 p. p. (excl. syn. *p. miniatum* Rchb.). — *P. ochotense* A. Tolm. in Journ. Bot. de l'URSS 16, I (1930) 82. — Ic.: Hult., l.c., f. 13; Tolm., fig. 3.

Perennial, small, compactly cespitose plant; leaves short or elongated, up to 8 cm long, canescent from appressed bristles, pinnatisect; segments drawn apart, into 2–3 pairs, oblong-linear or lanceolate, grayish, often entire, rarely the lower segments dentate-lobate; leaf blade shorter than petiole; peduncles appressed-hairy with white bristles, 10–20 cm long,

twice as long as leaves, flexuous, ascending or erect. Flower buds oval, small, ca. 1 cm long, rufous-hairy; corolla 2–3.5 cm across, yellow-orange or red-orange, caducous; capsules small, mostly 9–10 mm, up to 12 mm, long, narrowly or broadly obovate, with appressed white bristles; scarious extensions of rays not fused, disk convex, with small sharp central point. July–August.

Stony slopes. — Far East: Kamch. (often), An. (Penzhina River basin).

Gen. distr.: Bering. Described from Kamchatka. Type in Geneva.

Note. *P. microcarpum* may be identical with *P. albo-roseum* described by Hultén; if so, it would have to be called *P. ochotense* A. Tolm. However, as I have not examined De Candolle's type specimen, I preferred to accept Hultén's interpretation of *P. microcarpum*.

13. *P. alboroseum* Hultén, Fl. of Kamtch. II (1928) 141. — Ic.: Hultén, l. c.

609 Perennial, forming medium-sized tufts; rootstock branches covered with remnants of dead petioles; stems 4–10 (15 mm) high, weak, often flexuous, with appressed white or rufous bristles; leaves sparse, covered with white bristles, pinnatisect, segments usually 2–5-lobed. Petals 4–10 mm long, white or whitish pink, with yellow basal spot; capsule ovate or globose-ovate, (5) 6–10 mm long, covered with appressed white or rufous hairs; scarious extensions of rays not fused; disk slightly convex; rays 5–6. July–August.

Far East: Kamch. Endemic. Described from Avachinskaya Sopka, 675 m, Hultén, No. 5086. Type in Stockholm.

Note. A very critical species, closely related to *P. microcarpum*. It is only distinguished by white or white-pink petals and the absence of a central mucro on the disk. Var. *elongatum* Hult. (specimens: Kinkil, Levitskii) is distinguished by its large growth and its bipinnatisect leaves. On the other hand, *P. alboroseum*, is distinguished from the closely related *P. angustifolium* A. Tolm. by a shorter, thicker capsule, smaller corolla, and shorter stem.

14. *P. involucratum* M. Pop. sp. nova in Addenda VI, p. 577.

Perennial, forming small tufts ca. 10 cm across; leaves 5–8 cm long, with small blade, pinnatisect; segments entire, oblong, acute, ca. 10 mm long, 3 mm broad; peduncles several times as long as the leaves, 20–40 cm high, large, erect, rarely ascending, with both appressed and spreading bristles. Flower buds globose, with dark rufous hairs; corolla minute, 1–2 cm across, probably orange-red, with yellow basal spot long retained on capsule; capsule appressed-bristly, obovate, sometimes subpyramidal, not larger than 10 mm; disk pyramidally ascending, scarious extensions of rays rigid, fused. June–August. (Plate LXI, Figure 1).

Indurated moraines, at 2,800–3,300 m. — Centr. Asia: W. Pam. -Al. (Pamir, Shugnan, Darvaz, Karategin, Gissar, upper Zeravshan, east of the Shchurovskii Glacier in the Turkestan Range). Endemic. Described from W. Pam. -Al. Type in Leningrad.

Note. Readily recognized by its very small, persistent, reddish petals. Transitions between it and *P. croceum* are rare.

15. *P. tianschanicum* M. Pop. sp. nova in Addenda VI, p. 577.

Perennial, forming rather dense, compact and broad tufts; leaves short, small, simply dissected into narrow approximate, broad ovate or oblong, obtuse, usually dentate caescent segments; flower stalks 5–15 cm long, often curved, slender, with appressed or spreading rufous hairs. Flower buds rounded-oval or oval, with dark brown bristles, small, ca. 10 mm; corolla 3–4 cm in diameter, petals orange (when dry), caducous, rarely persistent; stamens rather numerous, 1.5 times as long as the ovary; capsule shorter than 10 mm, broad, covered with appressed white hairs; disk flat; rays without fused scarious extensions. July–August.

Alpine meadows and stony slopes. — W. Siberia: Alt. (southern); Centr. Asia: T. Sh., Dzu.-Tarb. (Dzhungarian Ala-Tau). Endemic. Described from Tien Shan. Type in Leningrad.

Note. *P. tianschanicum* is distinguished from *P. canescens* A. Tolm. (and *P. pseudocanescens* M. Pop.) — to which it is most closely related — by its broader segments and by its petals, which turn orange upon drying. *P. tianschanicum* should presumably be considered as a high mountain species, adapted to life in the alpine zone, and derived from *P. croceum*, whereas *P. canescens* (as also *P. pseudocanescens*) has a similar high-mountain origin, but is derived from *P. nudicaule*. The boundary between *P. tianschanicum* and *P. croceum* should be more precisely defined.

16. *P. canescens* A. Tolm. in Zhurn. Russk. Bot. Obshch. 16, I (1931) 77–78. — Ic.: l. c., fig. 1.

Perennial; rootstock vertical, thickish; tufts medium sized or small, rather compact; leaves gray-villous from semi-spreading bristles, not silky, not longer than 5 cm; petioles slender, as long as or longer than the blade; leaf blade pinnate, with 2–3 pairs of oblong-linear, entire, rarely dentate, acute segments; peduncles 5–10 cm long, large, little flexuous, with appressed or spreading bristles. Flower buds oval, ca. 10 mm long, densely covered with short dark brown hairs; corolla medium-large yellow, caducous, medium, ca. 3 cm in diameter; capsule small, rather broad with semi-appressed white bristles, disk slightly convex, rays without scarious extensions. July.

Stony slopes. — Centr. Asia: Dzu.-Tarb. (Tarbagatai system, Saur and Mustau mountains, Sapozhnikov). Endemic. Described from the Saur mountains. Type in Leningrad.

17. *P. pseudocanescens* M. Pop. sp. nova in Addenda VI, p. 578. — *P. canescens* A. Tolm. in Zhurn. R. Botan. Obshch. (1931) 78 (ex p., excl. pl. e montibus Saur). — *P. radicum* ssp. *canescens* Serg. in Animad. Syst. ex herb. Univ. Toms. (1931)

Perennial, 10–15 cm high, small tufted plant; leaves longer than in *P. canescens*, green, slightly villous; segments approached, broad, obtuse; peduncles large, with appressed or spreading bristles, brown rufous above. Flower buds densely black-hairy, more than 10 mm long, subglobose; corolla large, ca. 5 cm in diameter, yellow, rarely white (f. *album* Tolm. l. c.); capsule with rufous bristles, obovate when mature, ca. 10 mm long; disk flattish; rays nearly without scarious extensions. June–July.

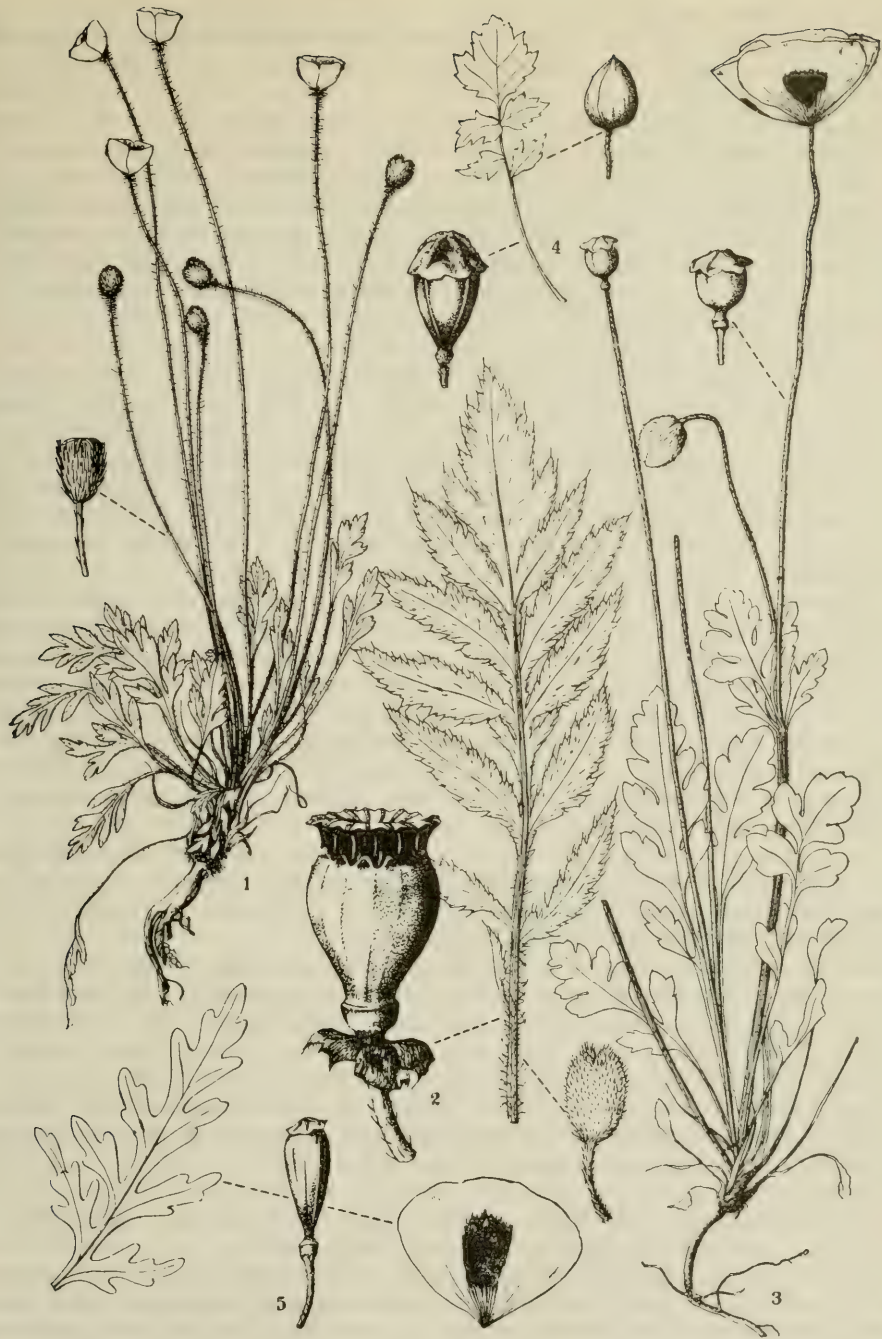


PLATE XLI. 1—*Papaver involucreatum* M.Pop.; 2—*P.bracteatum* Lindl.; 3—*P.commutatum* Fisch. et Mey.; 4—*P.chelidoniifolium* Boiss. et Buhse; 5—*P.ambiguum* M.Pop.

Alpine zone: meadows, stony slopes. — W. Siberia: Alt.; E. Siberia: Ang.-Say. **Gen. distr.:** Mong. Described from the flattened snow-covered summit of Topchugan Mountain (Kuznetsov and Tripolitova, 1913, No. 267). Type in Leningrad.

Note. *P. pseudocanescens* is very close to the Arctic *P. radica-*
tum except that its lobes are broader, and its stamens more numerous,
overtopping the ovary. From *P. canescens*, to which it is extremely
similar morphologically, it is distinguished by the rufous pubescence in the
upper part of the peduncles and capsules, by the densely black-pubescent
buds, and by the larger corolla. — Both species are distinguished from the
closely related *P. tianschanicum* by the corolla which turns yellow —
not orange — upon drying.

18. *P. radicatum* Röttb. in Skrift. Kjobenh. Selsk. Land. a. Vidensk.
X (1770) 455; Lundstr. in Act. Horti Berg. VII (1923) 410—413; A. Tolm.
in Not. Syst. ex herb. Hort. bot. Petr. IV (1923) 81; Nordhagen in Bergens
Museums Arbok 1931, Heft 1 (1932) 47—49. — *P. nudicaule* ssp. *radi-*
catum. Fedde in Engler, Bot. Jahrb. XXXVI (1905) Beibl. No. 81, 34; in
Pflanzenreich IV, 104, p. 376; Busch, Fl. Sib. i Dal'n. Vost. I, 32. — Ic.:
Röttb., tab. VIII, f. 24; Rechb., Pl. Crit. VIII, tab. 742, f. 24; Lundstr.,
l. c., tab. 2, f. 1 et 4; Nordh., l. c., Taf. 4, 5.

Perennial, 8—15 cm high, forming small cushions; leaves pinnate, small,
segments approached, entire, lanceolate or oblong, acute, rarely bifid; flower
staks short, upright, with spreading hairs dark rufous in upper half. Flower
buds rounded-oval, densely covered with dark brown hairs; corolla medium-
large, 2.5—4 cm in diameter, with broad dark yellow petals, usually persistent
on capsule; capsules ca. 10—12 mm long, rather broad, obovate, with thick
dark rufous appressed or spreading bristles; stamens few, scarcely over-
topping ovary, anthers short, rounded; disk slightly convex, rays almost
without scarious extensions. June—July.

River gravels and stony and sandy places. — Arctic: Arc. Eur. (Vaigach,
Novaya Zemlya, Pai-Khoi), Arc. Sib. (lower reaches of the Yenisei),
Chuk., An. **Gen. distr.:** Ber., Arc., N. Am., Greenland, Iceland.
Described from Iceland. Type in Copenhagen.

Note. *P. radicatum* is distinguished from *P. nudicaule* by its low
growth, dense sprcading rufous pubescence of peduncles, and dense covering
of almost blackish hairs of the flower buds; chromosomes 35, instead of
7 as in *P. nudicaule*. A. I. Tolmachev has described two races which may
614 deserve specific status: *P. radicatum jugoricum* A. Tolm. and
P. radicatum polare A. Tolm. (1923), the former common to Vaigach
Island in the Northern Urals, and the tundras between them and the mouth
of the Yenisei, the latter common to the Far Arctic.

19. *P. pulvinatum* A. Tolm. in Trav. Mus. Bot. Ac. Sc. URSS XXIV
(1932) 269 and in Trudakh Polyarn. Kom. 13 (1932) 131.

Perennial, very densely cespitose, pulvinate; milky juice white; leaves
short, canescent from appressed white bristles, young leaves slightly silvery-
gray; petioles slender; blades minute, shorter than petioles, narrowly oblong,
pinnatisect, with 1—2-pairs of segments; segments entire, small, not
drawn apart, rarely elongated (to 7 mm long), linear-oblong, acute; peduncles
short 3—12 cm, slightly flexuous, ascending, slender, covered beneath with

semi-spreading, long setae with dark tips. Peduncles densely dark-villous, globular or oval, 10–14 mm long; corolla yellow or yellowish white or white, medium-large, 2.5–4 cm in diameter, caducous; stamens numerous, with yellow filaments and linear anthers longer than ovary; capsule broadly clavate, cuneately tapering at base, not pedicelled, covered with appressed very dark bristles, probably to 10–12 mm long when ripe; disk convex; sharp central point inconspicuous or obsolete; rays with insignificant scarious extension in angles. July.

Sandy crests and stony slopes. — Arctic: Arc. Sib. (Eastern Taimyr). Endemic. Described from the lower reaches of the Yamu-Tarid River 74°26'N. (A. I. Tolmachev 1928). Type in Leningrad.

Note. *P. pulvinatum* is very close to *P. radiculatum* from which it is distinguished by its more dense tufts, appressed pubescence, and grayish leaves. Undoubtedly, there are transitions to both *P. radiculatum* and *P. angustifolium*.

20. *P. angustifolium* A. Tolm. in Trav. Mus. bot. Ac. Sc. URSS XXII (1930) 368.

Perennial, milky juice white or pink, cespitose; leaves covered with semi-appressed, white, up to 7–8 cm long bristles; petioles slender, filiform, blades shorter than petioles, pinnatisect into narrow, 0.1–1.5 mm broad, linear, elongated segments terminating in a bristle; 2–3 pairs of segments separated from each other; peduncles slender, erect, ca. 15 (10–23) cm long, covered with appressed white bristles below and more spreading setae above. Flower buds elliptical, sparsely covered with short rufous hairs, 12–13 mm long; corolla yellow or white or pink, medium-large, ca. 3 (–4) cm in diameter, caducous; stamens numerous or few, visibly topping the ovary; capsules small, ca. 12 mm long, clavate, tapering at base into a distinct pedicel, covered with very dark appressed bristles; rays strongly descending below sutures, almost without scarious extensions, these fused at angles.

Arctic: Arc. Sib. (Gydan tundra, Yuratskaya Guba, A. I. Tomachev 15 VIII 1926, No. 585–591; at Cape Minina, 19 VIII 1926 A. I. Tolmachev, No. 728; lower reaches of the Yenisei, 71°45', village of Goldchikha. In dry sandy locality among *P. radiculatum* polare. The only tufted plant. 5 VIII 1926 A. I. Tolmachev, No. 254. Endemic. Described from Yuratskaya Guba. Type in Leningrad.

21. *P. lapponicum* (A. Tolm.) Nordhagen in Bergens Museums Arbok (1931) 1 Hefte Naturvidens. Rekke No. 2, p. 45. — *P. radiculatum* ssp. *lapponicum* A. Tolm. in Not. Syst. Herb. Hort. Bot. Petrop. IV (1923) 86. — *P. nudicaule kvaenangense* Lundstr. in Acta Horti Berg. VII (1923) 416. — *P. nudicaule genuinum arctosibiricum* Lundstr., l.c., 240 (p. p. quoad pl. Kolaensem). — Ic.: Lundstr., l.c., tab. 2, f. 2; Nordhagen, Taf. 1 (photo), f. 4, No. 5 et f. 5 A. (capsula).

Perennial, densely cespitose; milky juice yellow; leaves 4–12 cm long, with long slender petioles, grayish green, more or less white-setose, pinnatisect, with 3–4 pairs of segments; segments separated, lanceolate or lanceolate-linear, usually dentate, elongated or reduced, acute or obtuse; peduncles numerous, 10–30 cm long (or always 6–8 cm, in f. *micranthum* A. Tolm.), straight, glabrescent below, with appressed white or dark bristles

above. Flower buds small, covered with short dark hairs; corolla yellow; petals 1.3–2.3 cm long, soon caducous; stamens almost as long as the ovary; capsule 1.3 cm long, 0.5–0.7 cm broad, pyriform-oval or clavate, with sparse appressed dark setae; disk convex; rays extending downwards from sutures; scarious extension of rays poorly developed; disk sometimes with small central mucro.

Arctic: Arc. Eur. (Kola Gulf, Khibiny Mountains and Monche tundra).

Gen. distr.: N. Norway. Described from Imandra Lake. Type in Leningrad

Note. Undoubtedly closely related to *P. angustifolium* A. Tolm., from which it is distinguished only by its yellow milky juice. This series is close to the group of species *P. lapponicum* — *P. pulvinatum* — *P. angustifolium* — *P. alboroseum* and stretches, along with the authentic *P. radicatum* across the entire Arctic zone of Eurasia.

22. *P. nivale* A. Tolm. in Svensk. Bot. Tidskrift 24 Heft 1 (1930) 42. — Ic.: l. c., f. 4 (p. 41).

616 Perennial, tufts apparently larger; leaves medium-sized (6–10 cm long), glabrescent, with sparse bristles, bipinnatisect; segments long-petioled; their lobes separated, small, oblong-linear or linear-obtuse; peduncles twice as long as leaves, 12–20 cm tall, straight, large, semi-appressed, with rufous bristles at apex, sometimes glabrescent. Flower buds ovoid-oblong or ovoid with short spreading bristles, more than 10 mm long. Corolla yellow, large, ca. 4 cm in diameter; stamens apparently few, overtopping the ovary; capsules, dark-setose, ca. 10 cm long, clavately cylindrical, loosely attached; disk slightly convex, without mucro; rays without scarious extensions. July.

E. Siberia: Lena-Kol. (between Sredne-Kolymsk and Yakutsk. Maidel. System of the rivers: Lena, Dyby, tributary of Tyry 14 VII 1891, Cherski), Endemic. Described from Tukulan River, Tos natural boundary, 914–977 m. Nedrigailov. Type in Leningrad.

Note. This species, with its bipinnatisect glabrescent leaves and narrow segments, is readily distinguished from all other Soviet representatives of the section *Scapiflora* and is related to the European *P. alpinum*.

Section 2. *OXYTONA* Bernh. in Linnaea VIII (1833) 463. — *Macrantha* Elk., Tent. Mon. Papav. (1839) 13; Fedde in Pflzr. IV, 104, 364. — Genus *Calomecon* Spach in Hist. Veg. Phan. VII (1839) 7. — Tall perennial plant; stems robust, densely covered with white bristles; leaves pinnatisect, large, with lanceolate, sharp-toothed segments. Flowers one, long-pedicelled, very large, red, petals often with a black spot. Filaments slightly thickened distally. Capsules large, glabrous, obovate or subglobular. Disk scarious, large, flat or slightly convex, distinctly denticulate, teeth curved when young. Rays not elevated above disk. Stems unbranched, 1-flowered. Propagates by layering (or, in cultivation, by cuttings). — All species of the section are connected by gradual transitions. Those described in the Soviet Union form an uninterrupted series from *R. bracteatum* to *P. monanthum*, of section *Pseudopilosa*. These species may be considered as *P. orientale* L. s. l.

1. Disk convex, with 8 rays 27. *P. paucifoliatum* (Trautv.) Fedde.
- + Disk with 11–18 rays 2.
2. Flowers with 2 or more bracts 2.
- + Flowers ebracteate 5.
3. Bracts several, 2–5 cm long 23. *P. bracteatum* Lindl.
- + Bracts 2, not longer than 1 cm 4.
4. Pubescence densely white-villous, bristles on flower stalks
horizontally spreading 25. *P. lasiothrix* Fedde.
- + Pubescence of peduncles of appressed bristles 24. *P. intermedium* DC.
5. Peduncles with appressed bristles 26. *P. orientale* L.
- + Peduncles with horizontally spreading bristles 25. *P. lasiothrix* Fedde.

23. *P. bracteatum* Lind., Coll. Bot. (1821) tab. 23; Boiss., Fl. Or. I, 107; Fedde in Pflzr. IV, 104, 365 (ex p.). — *P. orientale* var. *bracteatum* Ldb., Fl. Ross. I (1842) 91; Busch in Fl. cauc. crit. III, 4, 43 (ex p.); Shmal'g., Fl. I, 36. — *Calomecon bracteatum* Spach, Hist. veg. phan. VII (1839) 7. — Ic.: Bot. Reg., tab. 658; Lindley, l. c., tab. 23.

Perennial; stem 60–120 cm high, erect, spreading below, appressed-hispid above, robust, strong; leaves very large, up to 45 cm long, pinnatisect, with remote, large, oblong-lanceolate segments with forward pointing margins; cauline leaves numerous, scattered along the stem right up to the flowers or leaving a short pedicel; pedicel thick, appressed-setose, with two large, usually unequal leaf-shaped pinnatisect bracts below the flower and several (3–5) oval, coriaceous, entire, sometimes slightly lobate, appressed, short and densely hispid, sepal-shaped 2–5 cm long bracts with rigid, scarious, pectinate-dissected borders; sepals 3–4 cm long, sparsely pubescent, hairs short, appressed; corolla very large; petals 4–6, up to 10 cm long, blood-red, broadly attenuate into a claw, usually with large, elongated basal, black spot; capsule obovate, large; rays 15–18; disk flat, with elongated acute teeth. May–June. (Plate XLI, Figure 2).

Clayey slopes and plains. — Caucasus: Cisc. (Beshtau Mountain, Pyatigorsk, Grozny, Sleptovskaya railroad, station). Endemic. Described from the Caucasus, without record of location. Type in London?

Note. This species was described from a garden plant grown by Anderson in Chelsea, England, from seeds obtained from Fischer in 1818, 1819, and 1821 under the name of *P. orientale speciosum*, *P. o. pulcherrimum*, and *P. o. grandiflorum*. In the Fischer Herbarium, specimens of this plant are preserved under the name *P. orientale*. The seeds were certainly sent to Fischer from the Mineralnye Vody region—in all probability by Wilhelms—and therefore I consider that district as the locus classicus *P. bracteatum*. The Mineralnye Vody distribution area of *P. bracteatum* is entirely isolated from the region of *P. intermedium*, and thus *P. bracteatum* is a relict species. — It is extraordinary that not one of the authors known to us has accurately described the bracts of *P. bracteatum*; the characteristic feature of this species is the presence of calyx-shaped bracts with a pectinate scarious appendage, rather than the pair of herbaceous leaf-shaped bracts below the flowers—which may indeed be lacking.

24. *P. intermedium* DC., in Mem. Soc. Phys. et Hist. Nat. Geneve VII (1836) 301. — *P. bracteatum* var. *pseudo-orientale* Fedde in Pflzr. IV, 104 (1909) 365. — *P. pseudo-orientale* Medw. in Bull. Musée Cauc. XI, 3–4 (1918) 204.

Perennial; very similar to *P. bracteatum* in all characters—but not as thick, 70–80 cm high; leaves with same pubescence as *P. bracteatum*. Flower buds smaller, ca. 2–3 cm, more villous; leaf-shaped bracts under inflorescence absent (rarely present, see Note); sepal-shaped bracts few, 1–3, narrow, lanceolate, small, ca. 1.5 cm long, often slightly divergent, ciliate-hispid, very rarely with inconspicuous laminate-pectinate margin; anthers smaller than in *P. bracteatum*; petals up to 8 cm long, probably brick-red (i.e., red, but with orange tinge), with black spot above base (not at base), nearly square.

Caucasus: S. Transc.? Tal. Gen. distr.: Arm. -Kurd. Described from a cultivated specimen in Geneva. Type in Geneva.

Note. This species is very close to *P. bracteatum* but geographically it is completely isolated from it. Morphologically, it is intermediate between *P. bracteatum* and *P. orientale*, and where it often grows with *P. orientale*, it is impossible to find a clear boundary between *P. intermedium* and *P. orientale*. De Candolle, in comparing *P. bracteatum*, *P. intermedium*, and *P. orientale*—all of which grew in the Geneva Garden—says that *P. intermedium* and *P. orientale* are more branched and stronger than *P. bracteatum*; the latter character is not however, consistent with my conceptions of *P. bracteatum*. Further, in *P. bracteatum* and in *P. intermedium* the segment margins are ascending, while in *P. orientale* the segments are flat. According to De Candolle, the bracts of *P. bracteatum* are very unequal—one is twice as long as the others—whereas in *P. intermedium* they are equal; in *P. orientale* there are none. In *P. bracteatum* and *P. intermedium* the sepals and flower stalks are appressed-hispid; in *P. orientale* they bear spreading hispid hairs, a character which does not agree with my conception of *P. orientale*. The petals of *P. bracteatum* are dark red with a black spot and those of *P. orientale*, are orange-red with an inconspicuous spot; those of *P. intermedium* are intermediate.

It is very difficult to decide whether the type of *P. intermedium* in genera really represents a hybrid between authentic *P. bracteatum* from the Mineralnye Vody region and the authentic *P. orientale* from the Armenian region, grown in cultivation—as De Candolle had assumed—or whether these plants, which Fedde later called *P. bracteatum* var.

619 *pseudo-orientale* and Medvedev called *P. pseudo-orientale* Medw., originated in Armenia proper. All considered, this is beside the point since genetically *P. pseudo-orientale* certainly represents the ancient hybrid form due to hybridization of *P. bracteatum* and *P. orientale*.

Some of the specimens from Southern Transcaucasia have leaf-shaped bracts like those of *P. bracteatum*, which are 6 cm long. Besides this, there are several intermediate specimens where the bracts are intermediate between leaf-shaped, sepal-shaped, and in particular dissected, small, 2–3 cm long, with setose-margined; corolla as in the authentic *P. intermedium*; growth smaller. Such specimens are: Zangezur County (Nakhrai), Giradakh, 23 VI 1893 (Lipsky); Karabakh: Okhchi 13 VI 1871 (Radde) No. 1; Karabakh: Kegal-Dag; Bechenakh (Gavrilov); Alagez (N. and E. Busch).

25. *P. lasiothrix* Fedde in Pflnzt. IV, 104 (1909) 366.

Perennial, agrees in all characters with *P. intermedium* or with *P. orientale* (may have small bracts or none), but pubescence generally very dense, white-villous, the flower stalks bearing horizontally spreading setae.

Caucasus: Cisc. (Caucasian state reserve, 11 VII 1930 Leskov, No. 183).

Gen. distr.: Arm.-Kurd., Bal.-As. Min. (Agriri-Dagh.) Described from sanjak Giumiush-Khane (Argiri-Dah, Sintenis It. or. 1894, No. 5989 p. p. ex Fedde, l.c.) Type in Berlin.

Note. *P. lasiothrix* is one of the forms of the polymorphous hybridogenic cycle included in section *Oxytona*; it is very close to the typical *P. orientale*. We have seen that De Candolle — apparently incorrectly — considered the characteristic spreading bristles on the peduncle as typical for *P. orientale*. It is on the basis of this character that Fedde separated *P. lasiothrix*. I have preserved this species and extended it to include both the presence and the absence of bracts, because in the Caucasus this species is totally isolated and the Sintenis specimens (authentic) are bracteate or ebracteate, which makes them perfectly similar to the West Caucasian plant.

26. *P. orientale* L., Sp. pl. (1753) 508; Ldb., Fl. Ross. I, 90; Boiss., Fl. Or. I, 107; Shmal'g., Fl. I, 36; N. Busch in Fl. cauc. crit. III, 4, 41; Fedde in Pflnzt. IV, 104, 364. — Ic.: Tournef., Voy. Levant. II, 277; Bot. Mag., tab. 57.

Perennial; stem 40–90 cm, erect, few-branched, often simple, densely spreading-hispid-villous below; setae white; leaves large, up to 30 cm long, radical leaves long-setose-petioled; blade oblong, simply pinnatisect, with large number of segments; segments oblong or more often lanceolate, acute, rarely entire, often acutely dentate, terminating into a large seta, lower leaves separate, the upper approximate, the uppermost fusing into an acutely dentate gradually acuminate terminal lobe; cauline leaves similar to radical, reduced; uppermost sessile; pedicels long, thick, nearly white from appressed rigid setae. Flower buds ovate or broadly oval, 2–3 cm long, covered with spreading white setae; sepals 2 or 3; sepals large, red; petals 4 or 6, suborbicular, up to 9 cm long, orange-hot red, with a square black spot above their base; filaments dark, slightly expanded above; anthers oblong, violet; capsule glaucous, glabrous, obovate, 2–3 cm long; disk flat, with (11) 13–15 scarious rays, shortly denticulate, obtuse, subtruncate, rigid. June–July.

Meadows, rarely stony slopes in the forest zone, more often in the subalpine zone. — Caucasus: S. Transc. (Gokcha, Takyaltu, Akhalkalaki). **Gen. distr.:** Iran. (N.W. Iran), Arm.-Kurd., Bal.-As. Min. Described from the environs of Erzerum (Tournefort). Linnaeus merely writes: "in oriente."

Note. The typical *P. orientale* was collected by Tournefort in Erzerum and described in his "Relation d'un Voyage au Levant,"; it has red hot colored petals with an orange tinge and a black spot of the same size as in *P. intermedium*. This is also how it grows in the USSR, in Transcaucasia, and along the Turkish border up to Lake Sevan (Gokcha) in the southeast. On the northern slopes of the Lesser Caucasus and in the vicinity of the Trialet Range, it is replaced by a very closely related species *P. paucifoliatum* Fedde.

27. *P. paucifoliatum* (Trautv.) Fedde in Engler, Pflzr. IV, 104 (1909) 366. — *P. orientale* var. *paucifoliatum* Trautv. in A. H. P. IV (1879) 346. — *P. orientale* var. *parviflora* Busch in Fl. cauc. crit. III, 4 (1905) 41 (ex p.). — *P. dzeghamicum* Medw. in Acta Horti Tiflis. XVIII (1915) 15 in clave.

Perennial, very close to *P. orientale*, distinguished by a very short, and much thinner stem; entire plant thinner and smaller; 1 or 2 leaves on stem. Peduncle long, higher; corolla medium-sized, petals pinkish red, without spot; capsule with 8–10 (11) rays.

Almost stemless, white-bristled plant; stem very short, with 1 or 2 small leaves; radical leaves spreading-setose petioled, up to 20 cm long (pedicels 4–6 cm long, blade 10–15 cm long); blade lanceolate or oblong-lanceolate, pinnatilobate or irregularly serrate-crenate; lobes lanceolate, acute, serrate; peduncle very long, up to 35 cm, appressed-hispid; capsule broadly obovate; disk flat, scarious, obtusely edentulate.

621 Subalpine meadows. — Caucasus: Dag., S. and E. Transc. (Trialet Range near Lake Tabiskhuri, Radde; Tskhra-Tskharo Mountain, Juzepczuk). Endemic. Described from Lake Tabiskhuri. Type in Leningrad.

Note. *P. paucifoliatum* probably represents a hybrid of *P. monanthum* (section *Pseudopilosa*) and *P. orientale*, and, therefore, it is very difficult to determine the morphological limits between these three species. Trautvetter himself separated a specimen, collected by Radde near Lake Tabiskhuri, as *P. paucifoliatum*, and another as *P. monanthum*, although both bear leaflets on the lower part of the stem. In Juzepczuk's specimens of *P. paucifoliatum*, too, the number of rays varies from 8 to 11, i.e., approaches the number characteristic for *P. orientale*.

In addition, a series of related species, linked by transitions and therefore not always reliably distinguished, link *P. monanthum* through *P. paucifoliatum* and *P. orientale* to *P. bracteatum*. In this series the height of the plant and the number of cauline leaves gradually increase and the stem is especially well developed. The leaves increase in size and become more dissected; flowers become larger and more brightly colored; *P. monanthum* and, as far as I know, *P. paucifoliatum* as well always lack a black spot; *P. orientale* and usually also *P. bracteatum* have a spot.

Lastly, the number of rays gradually increases from 6–9 (*P. monanthum*), to 8–11 (*P. paucifoliatum*) to 13–15 (*P. orientale*) and to 15–18 (*P. bracteatum*). Herbaria specimens indicate that there are no breaks in the gradual increase of the characters indicated in the transition from one species to the next. In other words the species are only tentatively separated. It should be added that *P. orientale* and *P. bracteatum* represent polyploid species, with chromosomal numbers 14 and 21.

Section 3. **PSEUDO-PILOSA** M. Pop. — Sect. *Pilosa* Prantl in Engl. Pflzf. III, 2 (1889) 142 (ex p.); Fedde in Pflzr. IV, 104 (1909) 354 (ex p.). — Perennial, rigidly setose plant; petals orange-red or pinkish red, always without black spot; flowers solitary, on long peduncles, inflorescence not paniculate; leaves pinnatisect. Distinguished from the authentic *Pilosa* by the non-racemose inflorescence and the pinnatisect, not entire leaves. In addition to the USSR species there are also *P. lateritium*

C. Koch in Armenia and *P. rupifragum* Boiss. et Reut. and *P. atlanticum* Ball., in Morocco.

1. Stemless plant with stiff setose bristles. Flower buds covered with thick long appressed white hairs. Capsule 12–15 mm long, globular-ovovate to oblong (Lesser Caucasus) 28. *P. monanthum* Trautv.
+ Stems developed, 10–20 cm tall but shorter than flower stalks.
Flower buds densely covered with spreading soft rufous hairs.
Capsules 15–17 mm long, oblong-clavate (Main Range of the Caucasus)
. 29. *P. oreophilum* Rupr.

28. *P. monanthum* Trautv. in Bull. Acad. St. Petersburg. X (1866) 393; Fedde in Pflzr. IV, 104, p. 362 (excl. var. *obtusifolium* Fedde). — *P. orientale* var. *monanthum* Trautv. in A. H. P. IV (1879) 346. — *P. lateritium* γ *subacaule* Boiss., Fl. Or. Suppl. (1888) 23. — *P. oreophilum* var. *monantha* N. Busch in Fl. cauc. crit. III, 4 (1905) 45. — Exs.: Herb. Fl. Cauc. No. 360.

Perennial, stemless plant; rootstock rather slender; leaves with rigid spreading and semi-spreading, erect, long white bristles; petioles especially densely bristled, flat, broad, as long as or shorter than blade, dying completely; blade oblong, pinnatisect, sometimes narrow, sublanceolate, incised-dentate, rarely subentire, terminating in a long bristle, lower segments remote, upper segments connate, forming an entire dentate lobe, flower stalks spreading below, appressed white-hispid above, strong, erect, 25–40 cm, nearly twice as long as the leaves. Flower buds up to 15 mm long, oval, densely covered with appressed long white hairs, barbate; corolla large, 5–8 cm in diameter, orange-pink; petals overlapping, broad, without spot; stamens numerous; filaments yellow; anthers yellow, linear, slightly overlapping the ovary; capsules 12–15 mm long, obovate, globular-ovate or broadly oblong, glabrous; disk convex, with 6–9 rays; scarious extensions of rays fused, conspicuous, forming rounded teeth along edge of disk. June–July.

Stony places in alpine zone, rather rare. — Caucasus: W. Transc. Adzhar-Imeretian Range, E. and S. Transc. Endemic. Described from Shombobel Mountain in the Askhaltsikhe region. Type in Leningrad.

29. *P. oreophilum* Rupr., Fl. Cauc. (1869) 51; N. Busch in Fl. cauc. crit. III, 4 (1905) 44; Fedde in Pflzr. IV, 104 (1909) 362. — *P. lateritium* β *minus* Boiss., Fl. Or. Suppl. (1888) 23.

Perennial; stem 10–20 cm high, with few branches, spreading or recurved, hispid, angular; peduncles very long, longer than the stem, erect, spreading in lower part, appressed-hairy in upper part; radical leaves elongated, with rather short soft-haired petioles; blade narrow lanceolate, pinnatifid, with scattered hairs, lobes more or less deeply incised, thick, numerous, triangular, acute, sometimes slightly runcinate, entire or slightly triangularly sharp-toothed, terminating in a weak bristle; cauline leaves short-petioled, lower pair of segments-lobes drawn apart; upper leaves sessile, often tripartite, with pinnatilobate or sharp-toothed lobes. Flower buds oval, up to 20 mm long, densely covered with rufous, spreading, soft hairs; corolla large, 6–9 cm in diameter; petals broad, overlapping, bright orange-red, without dark spot; stamens numerous, their filaments as well as the linear anthers yellow; capsules glabrous, oblong-clavate, 15–17 mm long, glaucescent, with prominent placental nerves; disk slightly convex, with

5—7 rays, narrower than capsule, rounded-dentate, with scarious margin and fused rays. June—August.

Subalpine and alpine meadows, bluffs, stony habitats, 1,700—2,500 m. — Caucasus: Greater Caucasus (below entire Main Range: Balkaria, Digoria, Ossetia, Svanetia). Endemic. Described from Mamisson Pass. Type in Leningrad.

Note. *P. oreophilum* only slightly differs from *P. monanthum* by its developed stem, much softer and denser pubescence (plant greenish) and acute triangular lobes and teeth of the less dissected leaves; flower buds with much longer, softer, more spreading hairs and a much narrower and longer pistil. *P. lateritium* C. Koch from Armenia is extremely close to the RSFSR plant, from which it is distinguished only by a much wider capsule.

Section 4. **MILTANTHA** Bernh. in Linnaea VIII (1833) 463; Fedde in Pflzr. IV, 104, p. 344. — *Pyramistigma* Elkan, Tent. Mon. Papav. (1839) 13. — Biennial, with conspicuous rosette of radical leaves; pubescence bristly, always spreading; leaves pinnatisect; stems profusely branching above, the reduced lateral branches frequently forming a paniculate-racemose, many-flowered inflorescence; petals pink, without black spot, readily caducous; stamens yellow, with filiform filaments; stamen girdle broad; capsule glabrous rarely hairy, tapering above and below, sometimes almost pedicelled, dehiscing by large valves; stigma small, narrower than capsule, often strongly pyramidal, sometimes nearly subulate, rarely almost flat. Narrow scarious margins of stigmatic rays fused; disk more or less conspicuously denticulate. A very characteristic, uniform section.

1. Leaves 2-, nearly 3-pinnatisect, with short, linear, obtuse, often crisp lobes, revolute-margined; capsule small, up to 10 mm long, narrow, oblong, subcylindrical, torulose from bulging seeds, glabrous. Flowers small 32. *P. roopianum* (Bordz.) Sosn.
- + Leaves 1-, nearly 2-pinnatisect, with oblong or lanceolate lobes, almost not involute-margined. Capsules larger, 10—15 mm long, broader, not torulose from bulging seeds, smooth. Flowers larger 2.
- 624 2. Capsules glabrous 30. *P. caucasicum* M. B.
- + Capsules hairy 31. *P. persicum* Lindl.

30. *P. caucasicum* M. B., Fl. taur.-cauc. II (1808) 5; Ldb., Fl. Ross. I, 90; Boiss., Fl. Or. I, 109 (excl. syn. *P. armeniacum*); Fedde in Pflzr. IV, 104, 352. — *P. floribundum* Desf., Choix d. pl. Tournef. (1808) 62, tab. 46. — *P. armeniacum* N. Busch in Fl. cauc. crit. III, 4 (1905) 37, non DC. — *P. fugax* Poir., Encyc. V (1804) 118. — *P. floribundum* Fedde in Pflzr. IV, 104, 349, 350 (quoad. pl. caucasicas). — Ic.: Sims., Bot. Mag., tab. 1675; Bot. Reg., tab. 134 (1816).

Biennial, usually glaucous, rarely greenish gray, 15—40 cm; stem one, erect, obtusely tetragonous below, acutely angled above, with short lateral branches forming a many-flowered paniculate-racemose inflorescence, rarely branches elongated, few stems produced by each rootstock; radical

leaves up to 20 cm long, with slender, usually bristly petioles which are slightly triangular owing to the prominent midrib; blade oblong in outline, 1- or nearly 2-pinnatisect; segments (7 pairs) sessile, oblong or lanceolate, obtuse or acute, remote or the upper approximate, pinnatifid or dissected almost to base into oblong or lanceolate, rarely linear-lanceolate, obtuse or acute lobes usually terminating in a bristle; cauline leaves short-petioled or sessile, similar to radical leaves, large or slightly reduced, sometimes with reduced lateral segments. Flower buds ovate-oval, oval or globular, 10–13 mm long, glabrous or bristly; corolla pink; petals 2–3 cm long; peduncles erect, large, glabrous, usually shorter than 10 cm, rarely longer when inflorescence spreads; capsules glabrous, smooth, glaucous, usually oboblong or obovate, nearly tapering into a pedicel, rarely oblong-clavate or subglobular-ovate, 10–15 mm long; disk high or low, pyramidal, rarely nearly flat; rays 4–6, rarely 3 or 7–8. June–August.

Stony slopes, gravels, and rocks up to 3,000 m. — Caucasus: Cisc. (Tersk), Dag., E. and S. Transc., Tal., W. Transc. (rarely Adzharia, Abkhazia, on the Kodor Range). **Gen. distr.:** Iran. (NW), Arm.-Kurd. Described from the foot of Mount Kazbek. Type in Leningrad.

Note. An extremely variable species, sometimes completely glabrous, but usually more or less bristly, with slender or thick bristles, nearly acicular; unusually variable in shape and pubescence of flower buds, and form of capsule and disk.

In the Caucasus, Fedde, followed by Grossheim (Fl. Kavk. II, 134–135), distinguished, in addition to *P. caucasicum* also *P. floribundum* Desf. and *P. fugax* Poir. as follows:

- | | | |
|-----|--|-----------------------------|
| 625 | 1. Capsules oblong, tapering at both ends. Petals larger | 2. |
| + | Capsules obovate (or subglobular). Petals smaller, 15–25 mm long | <i>P. fugax</i> Poir. |
| 2. | Leaf lobes obtuse; glabrescent plants | <i>P. caucasicum</i> M. B. |
| + | Leaf lobes acute. Plants more bristly | <i>P. floribundum</i> Desf. |

An examination of a large collection of herbarium specimens reveals that because of the extreme variability of all indicated characters these distinctions are invalid. One may only say that in the north (Terskii Range, Dagestan, parts of the Main Range), *P. caucasicum* is widely distributed, without becoming dominant; stem not as tall, more branched, with elongated branches; pubescence slighter and sparser, of slender bristles; leaves crenate, lobes obtuse or subobtuse; capsule most often oblong, with short pyramidal stigma. In the south, especially along the Araks River, *P. floribundum* predominates; plant prickly-bristly, stem taller, branches short, forming a paniculate inflorescence; leaf segments and lobes narrow, acute; capsules obovate; disk high or low pyramidal or flat. The indicated characters are not consistent. Specimens of the type *P. floribundum*, such as those collected by Lagovskii, were even found in the Kazbek, while in the south specimens were found with characters of *P. caucasicum*. Moreover, there are all possible transitions between the alternative characters proper, and the development of intermediate characters does not show clear geographical limits. The attempt to separate numerous small local species failed, probably because of the lack of sufficient herbarium specimens. From the point of view of nomenclature, it is possible that our species should be called *P. fugax* Poir. (1804) rather than

P. caucasicum M. B. (1808) or *P. floribundum* Desf. (1808). We have not seen the type of *P. fugax* Poir., collected in Iran (Mount Elwend, Michaux, after DC. Syst. II, 84), but the original description states *petalis minimis*, which does not fit our plant. Hence, for the time being, I retain the name *P. caucasicum*, although I am rather confident that our species, broadly conceived, should be called *P. fugax* Poir.

31. *P. persicum* Lindl., Bot. Reg. (1833) tab. 1570; Boiss., Fl. Or. I, 109; Fedde in Pflzr. IV, 104, p. 348. — *P. caucasicum* Ldb., Fl. Ross. I, 90 (ex p.). — *P. armeniacum* var. *persica* N. Busch in Fl. cauc. crit. III (1905) 41. — Ic.: Lindl, l. c., tab. 1570.

Biennial, identical with the southern type of *P. caucasicum*, but capsules more or less flattened or slightly spreading, with thin bristly, sometimes almost silky hairs. June—August.

Stony and rocky slopes, rare. — Caucasus: E. Transc., Tal., S. Transc. **Gen. distr.:** N. Iran. Described from Iran. Type in London?

626 **Note.** Distinguished from *P. caucasicum* merely by pubescence of the capsule. The few available specimens from the Caucasus show variations similar to those in *P. caucasicum*. 1) Capsules subglobular, densely silk-hairy. Disk broad, nearly flat. In general the capsule fits the description given by Fedde (l. c., Fig. 38c); leaf segments more obtuse. Karabakh, Myakyan Gorge 30 July 1895, Lomakin. 2) Capsules ellipsoid-oval; disk high-pyramidal, acute, narrow. Armenia, Shakh-Dag Range, 25 July, 1928, Zedelmeier and Geidemann. Talysh, in the subalpine belt, 18 June 1830, K. A. Meier (capsules sparingly pubescent). These specimens may be identified with *P. flahaultii* Fedde in Pflzr. IV (1909) 347, considered by Fedde himself as a hybrid of *P. persicum* \times *P. floribundum*; the type is from the Botanical Garden in Montpellier, where *P. floribundum* was cultivated together (?) with *P. persicum*. — Judging from the illustration of the authentic *P. persicum* Lindl., the petals are brick-red; capsule oblong, stigma short pyramidal, narrow, acute — in fact it is more like *P. flahaultii* than *P. persicum* (as sketched by Fedde).

32. *P. roopianum* (Bordz.) Sosn. in Moniteur Jard. Bot. de Tiflis 27 (1913) 3. — *P. triniaefolium* var. *Roopianum* Bordzilowski in Act. Hort. Jurjew. XI (1910) 34. — Exs.: Herb. Fl. Cauc. No. 361.

Biennial; stems one or several, from one rootstock, 25–40 cm high, with thin and slender bristles; branches short, erect, forming in upper part of the stem a paniculate-racemose many-flowered inflorescence; pedicels and peduncles slender, subfiliform; leaves narrowly bipinnatisect, with rather thick segments, lobes ovate or oblong, dissected into narrowly linear, short, often crisp, revolute-margined obtuse lobes, terminating in a bristle. Flower buds globular, obovate, glabrous, 7–10 mm long; corolla small, ca. 3 cm across; petals 1–1.5 cm long; capsules narrowly oblong, subcylindrical, small, up to 10 mm long, torulose from projecting seeds, glaucous, glabrous; stigma short pyramidal, with 3–4 rays, small, ca. 1 mm long, inconspicuously denticulate along margin.

Caucasus: S. Transc. (Nakhichevan ASSR), Tal. (Zuvant). **Gen. distr.:** Arm. -Kurd. Described from the Oltu district of the Kars province. Type in Leningrad.

Note. This species belongs to the group related to *P. armeniacum* (L.) DC., (Syst. II (1921) 83), which is distinguished from the *P. fugax*—*P. caucasicum* group by torulose capsules. Judging by De Candolle's description it is quite possible that *P. roopianum* is, indeed, the authentic *P. armeniacum*, which Tournefort called "*P. hypecoifolium*... etc.", thereby referring to the thinly dissected leaves of the type of *P. armeniacum*, which we have not seen. Fedde (in Pflzr. IV, 104, p. 352), in his description of *P. armeniacum*, does not cite the locality mentioned by Tournefort, from which one may conclude that he, too, had not seen the type species. In all probability, this type originates in Erzerum, i.e., in the area close to Kars. The specimen cited by Fedde (l.c., 352); Sintenis It. or. 1890, No. 3070 Sipikor-dagh, under the name *P. armeniacum* (L.) DC., is in my opinion not distinguished from *P. roopianum*.

Section 5. ARGEMONORHOEADES Fedde in Pflzr. IV, 104 (1909) 326. — Annual; petals red, usually with black spot; flowers single on elongated flower stalks, not forming an inflorescence at end of branches; capsules bristly, very rarely glabrous; disk convex; rays pectinate-ascending, with rigid-coriaceous extensions fused between the rays.

1. Flower buds with 2 large hollow horns; filaments filiform; petals bright red with black basal arch, capsules 5—10 mm long, oval, ribbed, bristly, stem with rigid spreading bristles. 33. ***P. pavoninum*** Schrenk.
- + Flower buds hornless. Filaments strongly clavately-thickened at apex. Stems more minutely hispid 2.
2. Capsules oval or obovate 3.
- + Capsules cylindrical or clavately cylindrical 4.
3. Petals bright red, 2—4 cm long, with a variegated basal black spot; flower buds globular; stamen borne on a broad girdle, ca. 1 mm wide; capsule as in *P. pavoninum*, 5—10 mm long 34. ***P. ocellatum*** G. Wor.
- + Petals wine- or pink-red, small, 1.5—2 cm long, with black-violet spot at claw. Flower buds small, oblong. Stamens few, borne on a very narrow, linear girdle; capsule larger, 10—14 mm long, with more rigid recurved bristles 35. ***P. hybridum*** L.
4. Petals 2—2.5 cm long, brick-red; capsule clavate-cylindrical; plant greenish with greenish leaves, usually 20—30 cm, up to 40 cm tall 36. ***P. argemone*** L.
- + Petals 1.0—1.5 cm long, dark red; capsule cylindrical, 10—18 mm; plant 7—15 cm tall, smaller, canescent from appressed bristles, 37. ***P. belangeri*** Boiss.

33. *P. pavoninum* Schrenk, Enum. pl. nov. II (1842) 64; Fisch. et Mey. in Ind. Sem. Hort. Petr. IX (1843) 82; Boiss., Fl. Or. I, 116; Voronov in Izv. Kavk. Muz. XI (1918) 278. — Ic.: Gartenfl. XXXI, tab. 1095; Gard. Chronicl. XXVI, 329; Voronov, l. c., Fig. 6 and 7, p. 379. — Exs.: HFR No. 853.

628 Annual; stem 20–30 (up to 50) cm high, erect, large, more or less branching, with rigid spreading bristles; radical leaves long-petioled, bipinnatisect, green, slightly bristled; blade ovate, with remote segments; segments subsessile or short-petioled, ovate, pinnatisect or incised into short, oblong or ovate, often dentate, rarely entire, blunt or acute lobes with flat or barely involute margins, terminating in a bristle; cauline leaves sessile or subsessile, tripartite; segments pinnatisect into lanceolate acute lobes or lobules, with thick acute sections. Flower buds oval or ovate, 10–15 mm long, sometimes subglobular, with spreading bristles, sometimes rufous-villous, with conspicuous more or less long, hollow apical horns; petals bright red, with black basal arch, 2–5 cm long, broad, rounded; stamens numerous, filaments black, slender, filiform, usually markedly longer than ovary; anthers dark violet or black, pollen blue; capsules 5–10 mm long, oval, sometimes (small) subglobular, ribbed, with semi-spreading white bristles along, sometimes between, ribs; stigma convex-hemispherical, with 4–11, most often 5–8 rays; disk usually small, narrower than capsules; stamen girdle broad; seeds gray, minute, reticulate-alveolate; alveoli very narrow, difficult to distinguish at $\times 10$, with undulate-flexuous walls. April–May. (Plate XLII, Figure 4).

Clayey, rarely stony slopes of the lower mountain zone (semidesert zone).—Centr. Asia: Mtn. Turkm., Kara K., Amu D., Pam.-Al., Syr D., Kyz. K., Sh., Balkh., Dzu.-Tarb. Gen. distr.: Dzu.-Kash., Iran. Described from Ala Kul Lake, after plants grown from seeds collected there. Type in Leningrad.

Note. This species produces a remarkable mass flowering in the foothills of Turkmenistan, Uzbekistan, Tadzhikistan, and Kazakhstan.

34. *P. ocellatum* Woron. in Bull. Musée Caucase XI (1918) 276–280. — *P. hybridum* β *grandiflorum* Boiss., Fl. Or. I (1867) 117; N. Busch in Fl. cauc. crit. III, 4, 35; Fedde in Pflzr. IV, 104, 333. — *P. hybridum* var. *microcarpa* N. Busch (1905), l. c. — *P. pavoninum* var. *incornutum* Fedde, l. c. 334. — *P. apulum* Ldb., Fl. Ross. I, 88 (non Ten.). — Ic.: Bopohob, l. c., fig. 4, 5. — Exs.: H. F. A. M. No. 568.

629 Annual; stem 15–30 (–40) high, rounded, slightly branching, erect, covered with sparse, white, rather soft, spreading bristles; radical leaves with long, slender, softly bristled petioles; blade ovate in outline, bipinnatisect; 3–4 pairs of segments sessile, oblong, with slightly decurrent base, pinnatisect into alternate, oblong or lanceolate-triangular, entire or dentate, acute lobes terminating in a bristle; upper cauline leaves sessile, tripartite into pinnately or bipinnately dissected segments with linear-lanceolate lobes (or lobules) with long bristles at tip of teeth; lobes (lobules) not or barely not revolute-margined; peduncles with appressed white bristles, rather slender, long. Flower buds spherical, rarely oval, hornless, 10–12 mm across with spreading rufous bristles, extremely rarely glabrescent; corolla bright red, large, 4–8 cm in diameter; petals with large black basal spot with or without a red ocellus; black spot sometimes in the form of an arch, as in *P. pavoninum*, sometimes with 2 small, triangular lateral spots (var. *turcomanicum* M. Pop.); petals overlapping; stamens numerous with black filaments, strongly clavately thickened at apex; anthers oblong-linear, not azure, barely overtopping stigma; capsule oval or obovate to subglobular, 5–10 mm long, with slightly prominent ribs, covered with semi-spreading, erect bristles; disk small, convex, with 5–10 rays; stamen girdle broad, ca. 1 mm long. April–May. (Plate XLII, Figure 5).

Clayey slopes in wormwood semideserts. — Caucasus: Cisc. (Terskii region, Khasavzurt), Dga., E. Transc.; Centr. Asia: Mtn. Turkm. (western Kopet-Dagh). **Gen. distr.:** Iran. (northern slopes of the Elburz). Described from Goris-Tskhali (April) 1902, Dzhebudzhe. Type in Tbilisi.

35. *P. hybridum* L., Sp. pl. (1753) 506; Ldb., Fl. Ross. I, 88; Boiss., Fl. Or. I, 117; N. Busch in Fl. cauc. crit. III, 4, 33 (excl. var. grandiflora et microcarpa); Fedde in Pflzr. IV, 104, 332 (excl. var. tenuifolium et grandiflorum). — *P. argemone* var. *hybridum* Schmalh., Fl. I (1895) 46. — *O. hispidum* Lam., Fl. France III (1778) 174; Rouy et Foucaud, Fl. Fr. I, 161. — Ic.: Engl., Bot. tab. 43; Rchb., Ic. Fl. Germ. III, tab. XIV, f. 4476; Hegi, Illustr. Fl. Mitteleur. IV, tab. 123, f. 4; Hallier, Fl. Deutsch. 13, fig. 1927; Bonnier, Fl. ill. France I, pl. 25, f. 108. — Exs.: H. F. A. M. No. 567.

Annual, 10–30 cm tall; stem often branching from base, angular, covered with long, semi-appressed hairs, often violet at base, stoutish; leaves profuse, rigidly scabrous-bristly, radical leaves with long villous petioles, 2- nearly 3-pinnatisect, the segments ovate, sessile, lobes thick, lobules oblong, obtuse; cauline leaves sessile, tripartite, the segments 1- or 2-pinnatisect into linear, elongated revolute-margined, acute or obtuse lobules; peduncles short, stoutish, often flexuous, appressed-hairy; flower buds small, hornless, oval-oblong, up to 10 mm long, with sparse long semi-appressed bristles; petals obovate, small, 15–20 mm long (flowers 2–3 cm in diameter), caducous, light wine-red, with small black or violet basal spot; stamens few, with black filaments, gradually thickening at apex, tapering below; anthers short oval, brown; pollen blue; stamen girdle very narrow, inconspicuous; capsule rather large, 10–14 mm long, broadly oval, covered with rigid, spreading often recurved bristles; stigma small, convex, with 4–9 rays; seeds black, rounded, with rectangular, large network of alveoli. April–June. (Plate XLII, Figure 3).

Dry slopes, gardens, cultivated and fallow fields in the semidesert, semi-steppe, and steppe zones. — European part: Crim.; Caucasus: Cisc., Dag., W., E. and S. Transc.; Centr. Asia: Mtn. Turkm. (western Kopet-Dagh). **Gen. distr.:** Iran., Arm.-Kurd., Med., Bal.-As. Min., Centr. and Atl. Eur. Described from Southern Europe. Type in London.

Note. Very consistent in its characters; readily distinguished from the related *P. ocellatum* and *P. pavoninum* by its leaves, small, oval, hornless flower buds, smaller and less bright corolla, larger capsule covered with spreading bristles, and very narrow stamen girdle. The latter is a particularly useful character to distinguish *P. hybridum* from *P. ocellatum* and *P. pavoninum*, as fruiting specimens lack flower buds and flowers; Fedde's report of *P. hybridum* for the whole of Turkestan, up to the Ili River, is erroneous. In Central Asia *P. hybridum* is not encountered outside the environs of Kara-Kala.

36. *P. argemone* L., Sp. pl. (1753) 506; Ldb., Fl. Ross. I, 83; Boiss., Fl. Or. I, 118; Shmal'g., Fl. I, 35; N. Busch in Fl. cauc. crit. III, 4, 33; Fedde in Pflzr. IV, 104, 328. — Ic.: Rchb., Ic. Fl. Germ. XIV, F. 4475; Hallier, Fl. Deutsch. 13, 152, f. 1296; Hegi., Illustr. Fl. Mitteleur. IV, tab. 123, f. 3; Bonn. fl. ill. France I, pl. 24, f. 107.

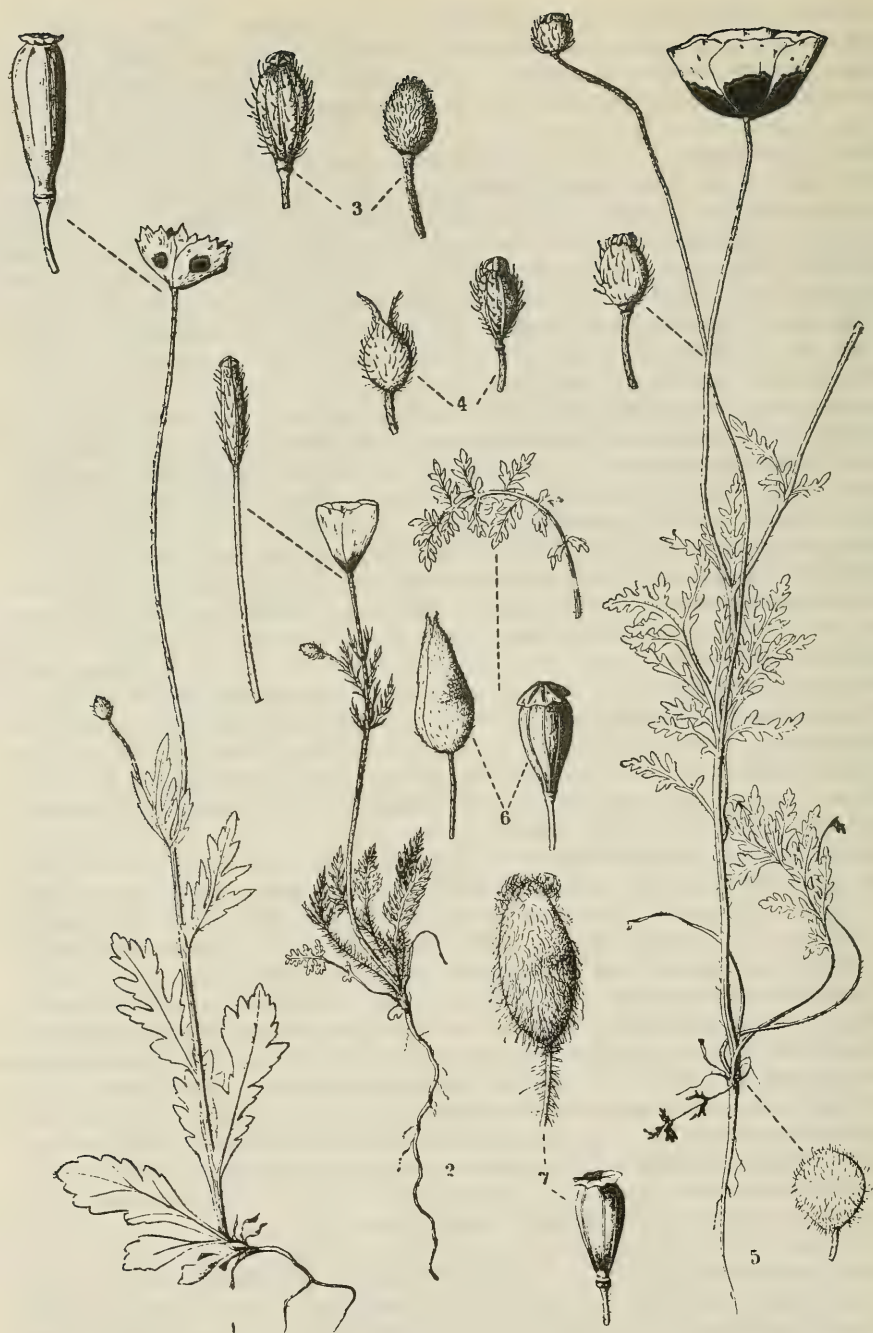


PLATE XLII. 1—*Papaver litwinowii* Fedde; 2—*P. belangeri* Boiss.; 3—*P. hybridum* L.; 4—*P. pavonium* Schrenk; 5—*P. ocellatum* Woron; 6—*P. arenarium* M.B.; 7—*P. bipinnatum* C.A.M.

Annual, up to 40 cm tall; stem often branching from base, with sparse appressed bristles, green, radical leaves 20 cm long, bipinnatisect, with remote segments divided into linear-lanceolate dentate lobes. Flower buds oblong, up to 15 mm; flowers red; capsule up to 20 mm long, clavate-cylindrical, usually broadened toward apex, with spreading or semi-appressed bristles or glabrous below or entirely glabrous; stigma like *P. belangeri*. May—July.

Fields, fallow fields and stony places.—European part: M. Dnp. (W.), Crim. (Simferopol). **Gen. distr.:** Scandinavia, Centr. and Atl. Eur., Med., Bal.-As. Min., Iran. Described from Europe. Type in London.

633 **Note.** *P. argemone*, is a typical mesophyllic form. It is primarily a native of Central Europe. In the Soviet Union it is rare. In the Crimea it is confined to the vicinity of Simferopol (Sredinskii!). The more xerophilous form, approaching *P. belangeri*, with its white pubescence, smaller leaves, predominantly dentate, not pinnatisect segments, and its narrowly cylindrical capsule, is more frequent in the Crimea; I did not see the petals of this form but presume that they approach *P. belangeri* in their small size and deeper color. Such specimens are: Flora taurica 1893, Shnitnikov. Sevastopol, 5 V 1896, anonym. Balaklava Valley, 30 April 1905, N. A. Bush. Whether there is a clear morphological distinction between *P. argemone* and *P. belangeri* or not can be resolved only by experimental cultivation.

37. *P. belangeri* Boiss., Fl. Or. I (1867) 117, Fedde in Pflzr. IV, 104, 330.—*P. desertorum* Grossh. in Grossh. et B. Schischk., Pl. or. exs. (1924) 23.—**lc.:** Belanger, Voy. aux Indes Orient. **lc.** (no number).—**Exs.:** Pl. orient exs. No. 85.

Annual, grayish plant, 7–15 (–20) cm tall; stem large, erect, rounded, stem and pedicels covered with appressed white bristles, branches simple or slightly upright; leaves small, slightly hispid, the lower with bristle-covered petioles, with an oblong, pinnatisect blade, the segments oblong-linear, obtusely dentate or pinnatifid into small lobes, slightly revolute-margined, with bristle at tip; cauline leaves few, tripartite, each segment pinnatisect into linear lobes with revolute-margins; peduncles large, straight, the middle often markedly thickened distally. Flower buds small, 6–10 mm long, oblong, with sparse, semi-spreading bristles, and incipient small apical horns; filaments black, clavately thickened distally, subulate before the short oval anthers; petals dark red, with black basal spot, 10–15 mm long, obovate-oblong; capsule oblong-cylindrical or cylindrical, 10–18 mm long, 3–3.5 mm broad, conically expanded at base covered with semi-spreading or spreading white bristles; stigma slightly convex, most often with 4 rays, with very conspicuously fused scarious extensions between rays. April—May. (Plate XLII, Figure 2).

Stony slopes in lower mountain zone.—Caucasus: S. Transc. (Armenia and Nakhichevan). **Gen. distr.:** Iran. Described from Southern Iran (Persepolis). Type in Geneva.

Note. Apparently *P. desertorum* cannot be distinguished from *P. belangeri*; the only difference between them, judging by the type specimens, is the more slender, bipinnatisect leaves of *P. belangeri*, as compared with the usually simply pinnate leaves of *P. desertorum* Grossh. (Type from distr. Nachitshevan, in montibus Darry-dagh in lapidosis, 20 May 1923 leg. A. Grossh.—*P. belangeri* (*P. desertorum*)

is very close to *P. argemone*, from which it differs only by the lower growth, the xerophilous aspect, the gray pubescent stems, the smaller leaves with approximate segments and lobes, the smaller and darker flowers, and the narrower, nearly always cylindrical, always densely bristled capsule.

634 Section 6. **CARINATA**. Fedde in Pflzr. IV, 104 (1909) 334. — Annuals; flowers single at tips of branches, not disposed in a racemose inflorescence; petals bright red with black spot; capsules glabrous (very rarely bristly?), elongated, ribless; disk convex; rays pectinate-ascending, strongly drawn down along placental nerves. Disk readily caducous in fruit; connective anthers with small globular appendage.

38. *P. macrostomum* Boiss. et Huet in Boiss., Fl. Or. I (1867) 115; N. Busch in Fl. cauc. crit. III, 4, 29; Fedde, l. c., 335. — *P. floribundum* Ld., Fl. Ross. I, 90 (non Desf.).

Annual; stem 20–60 cm high, with soft scattered spreading bristles, sometimes glabrescent, branching; leaves pinnatisect or deeply incised, glabrescent, with elongated, lanceolate, sharp-toothed, acute segments terminating in a bristle; upper leaves sessile, tripartite, with pinnatisect segments; lobes usually narrow, lanceolate-linear or linear; peduncles robust, not long, often flexuous, appressed-bristly; flower buds large, up to 20 mm long, oval, with sparse, spreading, white or rufous hairs; petals bright red, with a large, black, liguliform, square or broadly cuneate subreniform spot, narrower on the internal petals; stamens numerous, with slender black filaments and black rounded anthers, the connective bearing a small, orange, capitate apical appendage; capsule 10–20 mm long, obovate or oblong-clavate, smooth, glabrous, glaucous, even ripe capsule without prominent placental nerves; disk with fused scarious-coriaceous extensions of 5–10 rays; readily caducous, opening the capsule; disk teeth carinate-ascending, abruptly recurved at edge of capsule. June–August.

Fields, fallow fields, roadsides, often also stony slopes, to 2,000 m. — European part: L. V. (Biryuchya Kosa at the mouth of the Volga near Astrakhan-Karelin); Caucasus: Dag. (Derbent), E., S. and W. Transc. (rarely), Tal. **Gen. distr.:** Arm.-Kurd., Iran., Bal-As. Min. (Anatolia). Described from Asia Minor. Type in Geneva.

Section 7. **ORTHORHOEADES** Fedde in Pflzr. IV, 104 (1909) 290. — Annuals; flowers single at tips of branches, not in a racemose inflorescence; petals bright red (rarely white), usually with black spot. Capsules glabrous. Disk always well-developed, scarious, with low, not ascending rays. The largest and most complex section of the genus.

- | | | | |
|-------|----|---|----|
| | 1. | Capsules spherical or spherical-obovate, more or less abruptly tapering into a conspicuous pedicel (gynophore) | 2. |
| 635 + | | Capsules narrower, oboblong or obconical or clavate, rounded at base or gradually tapering towards base without pedicel (gynophore) | 3. |

2. Bristly hairs of peduncles horizontally spreading. Petals, especially the outer, broader than long, very large. If black spot present then found at the base. Terminal leaf segments elongated, lanceolate, often serrate-dentate. Flower buds to 25 mm long
 39. *P. rhoeas* L.
- + Peduncles with appressed bristles. Petals smaller, orbicular or obovate, not broader than long. Black spot mostly tetragonous, else rounded in center of petals and in any case remote from base. Terminal segment not elongated . . . 41. *P. commutatum* Fisch. et Mey.
3. Peduncles with rigid bristles, recurved, horizontal. Petals very large, to 6 cm long. Flower buds oval, hornless, with retrorse, rigid bristles. Leaves bipinnatisect. 49. *P. bipinnatum* C. A. M.
- + Peduncles with appressed bristles. Bristles on buds not retrorse .
 4.
4. Corolla very large, as in *P. rhoeas*, outer petals broad. Capsules obovate-oblong, rounded at base 40. *P. strigosum* Schur.
- + Corolla smaller, outer petals not as broad as long. Capsules gradually tapering towards base 5.
5. Flower buds with conspicuous erect, slender horns, especially obvious in the young bud. Leaves usually bi-or tripinnatisect into narrow lobes. Corolla large, red, with black spot. . . . 48. *P. arenarium* M. B.
- + Flower buds hornless 6.
6. Capsules very small, 6—7 mm long. Leaves delicate, lyrate pinnatisect; terminal segment large, much larger than the lateral (not always!). Petals ca. 15 mm long. Talysh
 47. *P. chelidoniifolium* Boiss. et Buhse.
- + Capsules larger, more than 10 mm long. Leaves not so sharply lyrate or not lyrate 7.
7. Plants more bristly on stem and leaves 8.
- + Plants glabrous or capitate; leaves, at least, glabrous. Petals small, caducous 9.
8. Petals large, up to 6—7 cm in diameter, bright red, with very large elongated black spot. Stamen girdle broad. Caucasus, near Tbilisi .
 42. *P. ambiguum* M. Pop.
- 636 + Petals small (flower 2—4 cm in diameter), pale red, with small black basal spot. Stamen girdle narrow 43. *P. dubium* L.
9. Leaves nearly bipinnatisect, with lacerated dentate lobes and lobules. Petals with large oblong black spot covering more than half the petals
 46. *P. lacerum* M. Pop.
- + Leaves pinnatisect or incised. 10.
10. Segments narrow, lobate-linear or linear. Petal spot small, basal. Southern Ukraine, Northern Caucasus 44. *P. laevigatum* M. B.
- + Segments of the less deeply incised leaves larger, broad, oblong or lanceolate. Petal spot central or absent 45. *P. litwinowii* Fedde.

39. *P. rhoeas* L., Sp. pl. (1753) 507; Ldb., Fl. Ross. I, 88; Boiss., Fl. Or. I, 113; Shmal'g., Fl. I, 36; N. Busch in Fl. cauc. crit. III, 4, 23; Fedde in Pflzr. IV, 104, 293; Kryl., Fl. Zap. Sib. VI, 1234.—Ic.: Rchb., Ic. Fl. Germ. tab. XV, f. 4470.

Annual, branching plant, to 80 cm; stem erect, stem and peduncles covered with rather rigid, horizontally spreading bristles; leaves pinnatisect, large; segments elongated, lanceolate, the terminal segment visibly larger, all segments acute, often serrate-dentate or incised; teeth or lobes triangular-lanceolate, sometimes runcinate, acute; cauline leaves tripartite, with pinnatifid elongated large segments; pedicels long, large. Flower buds up to 25 mm long, oval-oblong, with rigid bristles; petals very large, outer petals especially broad, 6 cm broad, often transversely oval, rarely orbicular, red or pink or white, with or without large black basal spot; stamens numerous, with slender, black or red filaments, anthers oblong; capsule glabrous, subspherical or broadly obovate, abruptly tapering into a conspicuous pedicel, slightly ribbed, 10–22 mm long; disk flat, scarious; rays low, 5–18, most often 8–10, teeth contiguous. April–July.

Weeds among crops, fields, roadsides, fallow fields, rarely stony slopes. — European part: M. Dnp., B., Crim. (rather often); Caucasus: seldom Cisc., Dag., Transc.; W. Siberia; Alt. (seldom introduced). **Gen. distr.:** Scandinavia, Atl. and Centr. Eur., Bal.-As. Min., Med., Iran. Described from Europe. Type in London.

Economic importance. A well-known ornamental garden plant with a profusion of forms and varieties, distinguished by simple and double flowers, with diversely incised, often fimbriated petals, ranging in color from entirely white to entirely blackish red or with different designs and margins. The dried flowers are officinal ("Flores Rhoeades,") and contain rhoeadine and a slight quantity of morphine, often used as a soporific. The petal pigment anthocyanidin is sometimes used as a color in syrups and wines. Excellently preserved flowers, from ancient Egypt of 1,100 B.C., are in the Cairo Museum. Cattle avoid this plant.

Note. This weed is unknown in its natural state. Presumably it originated in the Balkan Peninsula, where the related *P. rumelicum* Velen occurs in the wild. As a weed, *P. rhoeas* continues to spread even today.

40. *P. strigosum* (Boenn.) Schur in Verhand. naturf. Ver. Brünn. XV, 2 (1877) 66; Busch in Fl. cauc. crit. III, 4, 24 (excl. var. *commutatum* Fedde et specimina pleraque sub *P. strigoso* vero citato); Fedde in Pflzr. IV, 104, 308. — *P. rhoeas* β *strigosum* Boeninghausen, Prod. fl. Monast. (1824) 157; Shmal'g., Fl.

Annual, up to 70 cm high, covered in lower part with spreading bristles; leaves like *P. rhoeas*, pinnatisect, with elongated, lanceolate, acutely serrate-dentate or incised segments, like *P. dubium* nearly bipinnatisect, lobes oblong-linear, slightly remote-denticulate; peduncles with appressed bristles, elongated. Flower buds larger (up to 25 mm long), oval, bristly; corolla as in *P. rhoeas*. Capsules broadly obovate or oblong, with 5–12 rays, not tapering into a pedicel or with more or less conspicuous pedicel. April–June.

Stony slopes, fields, and fallows. — European part: Crim. (rather common). **Gen. distr.:** Centr. Eur., Bal.-As. Min., Med. Described from Transylvania (Hermannstadt). Type in Budapest.

Note. *P. strigosum*, as proposed with some hesitation by Rouy et Foucaud (Fl. France I, 156), is certainly a hybrid between *P. rhoeas* and *P. dubium* and, may therefore, exhibit different combinations of their

characters. Tentatively, we include in *P. strigosum* only those combinations that have: 1) peduncles with appressed bristles, 2) corolla similar to *P. rhoeas*, i.e., larger, with broader and longer-preserved petals. The characters of the capsule and leaves may vary from the typical *rhoeas* to the typical *dubium*. With respect to the characters of the leaves there may be distinguished: 1) var. *genuinum* Fedde, l. c., 309, leaves as in *P. dubium* (in the Crimea) and 2) var. *urophyllum* Fedde, l. c., 309, leaves as in *P. rhoeas*, i.e., terminal segment overlaps the lateral, segments often acutely dentate (in the Crimea). — I did not encounter *P. strigosum* in the Caucasus, although it probably occurs there.

638 41. *P. cummutatum* Fisch. et Mey. in Ind. sem. Hort. Petrop. IV (1837) 41; Ldb., Fl. Ross. I, 83, 744; Boiss., Fl. Or. I, 113; Fedde in Pflzr. IV, 104, 311. — *P. rhoeas* var. *commutatum* Elk., Tent. Mon. Papav. (1839) 28; Shmal'g., Fl. I, 36. — *P. strigosum* var. *commutata* Fedde ex Busch in Fl. cauc. crit. IV, 104 (1905) 25. — *P. schelkownikowii** N. Busch in Izv. Kavk. Muz. IV (1908) 40. — Ic.: Cesati, Stirp. Ital. fasc. I, XII.

Annual; stem up to 50 cm high, usually branching from base, with spreading branches, rarely simple, glabrous or not densely long-bristly; lower leaves pinnatisect, with rather large, ovate, crenate-dentate segments, glabrous or slightly bristly, rarely (poorly developed specimens) lower leaves pinnatifid, with oblong lobes; upper leaves sessile, tripartite, with pinnatisect segments and oblong, dentate-crenate, obtuse or acute lobes; peduncles long, often flexuous, more or less densely covered with appressed white bristles. Flower buds hornless, oblong-elliptic, up to 18 mm long, covered with long and slender antrorse bristly hairs; corolla large bright red; petals broad, rounded, 2–4 cm long, with a more or less large, tetragonous, oblong or rounded spot above its base and close to its center, sometimes the spot cuneate, running all across the petal or truncated in the center (*P. schelkownikowi* N. Busch); stamens numerous, with slender, black filaments, stamen girdle broad; capsule spherical or obovate-spherical, glabrous, 5–10 mm long, abruptly tapering into a distinct 1–1.5 mm long pedicel; disk of ripe capsule flat, with overlapping teeth; rays 5–10. April–May. (Plate XLI, Figure 3).

Semideserts, dry slopes, crops, roadsides. — Caucasus: Cisc. (in the Terek area, westward to Grozny and Sleptsovskaya; elsewhere in the west absent), Dag., E. Transc. (often), S., Transc. (often), W. Transc. (rarely), Tal.

Gen. distr.: Iran. (northwestern Iran), Arm.-Kurd., Bal.-As. Min. (As. Min.). Described from Transcaucasia. Type in Leningrad.

Note. Starting with Schur himself this species has often been confused with *P. strigosum* Schur and with *P. dubium*. From the former it is distinguished by smaller corollas, narrower petals with a central black spot, and smaller, always distinctly pedicelled capsules. From *P. dubium*, it is distinguished by the distinct conspicuous pedicels of the capsule, visible even in the early stages of development, the position of the spot on the petals, and the dimensions and bright color of the petals. — *P. cummutatum* does not occur in Crimea and Western Europe. Hybridization with *P. dubium* undoubtedly occurs and partially blurs the boundary between these species.

* *P. schelkownikowii*, appears to be an independent species. (Ed.)

42. *P. ambiguum* M. Pop. sp. nova in Addenda VI, p. 578 (probably hybridization of *P. commutatum* × *P. dubium*).

639 Annual; lower leaves pinnatilobate, with broad, slightly dentate-crenate lobes; upper leaves tripartite, with pinnatifid segments; lobes entire or slightly dentate, lanceolate or linear; stem branching, erect, strong, up to 50 cm high, with sparse spreading bristles; peduncles large, elongated, with appressed bristles; corolla large, 6–7 mm in diameter, bright red, with a very large, elongated black spot; capsules oblong-clavate, 18 mm long, gradually but distinctly tapering at base; disk flat, scarious, with broad but short incumbent teeth. (Plate XLI, Figure 5).

Caucasus: E. Trans. (Kodzory), W. Transc. (Racha), Tal. (Germin). Described from the Georgian SSR (Kodzory). Type in Leningrad.

Note. A very critical species, similar to *P. strigosum*. Leaves similar to those of *P. dubium*, but more glabrous; corolla bright, large, with large black spot, more closely resembling the corolla of *P. commutatum* but petal spot basal; capsules elongated, similar to those of *P. dubium*, but pedicel more distinct, disk teeth overlapping and stamen girdle broad, as in *P. commutatum*. The specimens mentioned have been referred by N.A. Bush to *P. dubium*.—*P. ambiguum* differs from *P. arenarium* by its slightly dissected leaves; it also resembles *P. lacerum*.

43. *P. dubium* L., Sp. pl. (1753) in append. 1196; Ldb., Fl. Ross. I, 89; Boiss., Fl. Or. I, 115; N. Busch in Fl. cauc. crit. III, 4, 27; Fedde in Pflzr. IV, 104, 313.—*P. rhoeas* var. *dubium* Schmalh., Fl. I (1895) 37.—*P. nothum* Stev. in Bull. Soc. Nat. Mosc. XXIX, 2 (1856) 285.—Ic.: Rchb., Ic. Fl. Germ. III, tab. XV, f. 4477; Bonnier, Fl. ill. Franche I, pl. 24; Hegi, III. Flora IV, 1, 31.

Annual; stem usually erect, few-branched, with appressed branches, rather densely and softly villous-bristly; lower leaves pinnatisect or in poorly developed specimens pinnatifid, with more or less large, broad, oblong, ovate segments, sometimes entire, sometimes dentate, obtuse or acute; upper leaves simple or bipinnatisect into linear or oblong-linear or lanceolate, entire or dentate, acute segments and lobes; teeth terminating in a long bristle; peduncles erect, large, long, with rather dense, often whitish appressed bristles. Flower buds remote, hornless, villous, small; stamens few, filaments very slender; corolla wine-red or pinkish, usually pale, rarely white (var. *albiflorum* Boiss.), small, caducous; pedals 1–2 (rarely 3) cm long, with dark or black basal spot, rarely without spot, usually obovate, not overlapping; capsules glabrous, oblong-clavate or clavate-cylindrical, the young obovate, sessile, without pedicels, 12–20 mm long, their surface, nearly nerveless, with rigid walls, glaucous; disk of mature capsule flat, scarious, teeth markedly overlapping; rays 4–11. April–June.

640 Stony and clayey slopes, fields and roadsides.—European part: Crim. (very often); Caucasus: Cisc., Dag., E. and S. Transc., Tal., probably also W. Transc. Gen. distr.: Iran., Bal.-As. Min., Med., Centr. and Atl. Eur. Described from Sweden and England. Type in London.

Note. A highly polymorphous species with many varieties (see Fedde, l. c.), which several botanists, Jordan in particular, have regarded as special species. A critical monograph would clarify these varieties.

44. *P. laevigatum* M. B., Fl. taur. cauc. I (1808) 364; Boiss., Fl. Or. 1, 114.—*P. dubium* var. *laevigatum* Elk., Tent. Mon. Papav. (1839) 25; N. Busch in Fl. cauc. crit. III, 4, 28; Fedde in Pflzr. IV, 104, 318 (excl. var. *erosum* Litw. et spec. *afghanica*, *persica*).—*P. rhoeas* var. *dubium* b. *laevigatum* Schmalh., Fl. I (1895).—Ic.: Rchb., Pl. crit. IV, tab. 352 (very good); Ic. Fl. Germ. III, tab. XVI, f. 1478b.

Annual, glaucous plant; stem 20–40 cm high, orbicular, slender, stem and leaves glabrous or glabrescent, often reduced, rarely well-developed, slightly branching; petioles of radical leaves more distinct than in the following species, blades oblong, gradually tapering at base, sublyrate-pinnatilobate; cauline leaves sessile, cuneate, deeply incised almost dissected into narrow, elongated, lanceolate-linear or linear, entire or acutely-toothed segments; peduncles long, slender, with sparse appressed bristles. Flower buds oblong, ca. 10 mm long, glabrescent; corolla small, pale-pink-red, with a dark basal spot; capsules to 20 mm long, usually shorter oblong-clavate, glabrous, glaucous, tapering to base; disk flat, scarious, slightly narrower than capsule, with short, rounded marginal teeth. April–June.

Steppes, stony slopes, rare.—European part: Bl. (Nikolaev, Odessa), Crim. (Sudak, Callier, after Fedde, l. c.); Caucasus: Cisc. **Gen. distr.:** Bal.-As. Min. Described from the environs of Odessa. Type in Leningrad.

45. *P. litwinowii* Fedde ex Bornm. in Beih. z. Bot. Central b. XIX, 2 (1906) 202 (nom. nudum) et in Pflzr. IV, 104 (1909) 341 (in adnof.).—*P. dubium* var. *laevigatum* subvar. *erosum* Fedde in Pflzr. IV (1909) 319.—*P. laevigatum* var. *erosum* Litw. in Trav. Mus. Bot. Ac. St. Pétersb. I (1902) 29 (excl. syn. *P. decaisnei*).

Annual, glaucous plant; stem 15–30 cm high, angular, erect, sparsely soft-villous, usually shorter than peduncles, simple, rarely branching; radical and lower cauline leaves oblong, without petioles, gradually tapering at base, slightly soft-villous, sometimes glabrescent, sublyrate-pinnatilobate; cauline leaves sessile, slightly villous or glabrescent, more or less deeply lacerated, pinnatifid into triangular, oblong, lanceolate or (in upper leaves) linear, slightly dentate or entire, acute lobes, in upper leaves the lower lobes sometimes more conspicuous than in the others; peduncles slender, long, with sparse appressed bristles. Flower buds 10–12 mm long, oblong, with sparse appressed hairs; corolla small, 2–3 cm in diameter; 15–20 mm long, obovate, not overlapping, readily and rapidly (in early morning) caducous, pink-pale red, with or without dark, almost black rounded central spot (one-colored), sometimes with incised-dentate distal edge; capsules oblong-clavate, glabrous, glaucous, tapering at base almost into a pedicel, slightly tapering distally, below disk, disk flat, scarious, slightly narrower than capsule, its margin with barely visible or somewhat truncate or rounded teeth; rays 5–10. April–May. (Plate XLII, Figure 1).

Stony slopes, dry river bed gravels, in lower mountain zone up to 1,500 m; sporadic.—Centr. Asia: Min. Turkm., Pam.-Al., T. Sh., Dzu.-Tarb. **Gen. distr.:** Iran. (Afghanistan: Badhyz-Kuram; N. and E. Iran). Described from Kopet Dag, Sulyuklyu near Ashkhabad. Type in Leningrad.

46. *P. lacerum* M. Pop. sp. nova in Addenda VI, p. 578.

Annual, glaucescent, glabrous or with isolated bristles in lower part of stem and along midrib of leaves beneath; stems branching, upright, ca. 40 cm

high; leaves nearly lacerated bipinnatisect; lobes of lower leaves oblong, irregularly dentate-incised, lobules short, obtuse; lobes of upper leaves linear, acute, remote and irregularly dissected into obtuse or acute, often crisp lobules, terminating in a bristle; peduncles long, erect, slender, with sparse appressed hairs. Corolla small (in specimens from Asia Minor pink-red, with large dark spot covering more than half the petal). Flower buds oblong, obtuse, 10–11 mm long, covered with slightly spreading, sparse, short, white hairs; capsules oblong-clavate, ca. 13–14 mm long, abruptly tapering at base into a barely visible pedicel; disk flat or slightly convex, scarious, with short, broad, not overlapping marginal teeth. May–June.

Stony (?) places. — Caucasus: S. Transc. (Khudoferinskii Post on the Araks River, flowers, fruit 13 May 1870 Radde, No. 103; Southern Karabakh, in lapidosis inter Akartschai et Chierus, flowers, fruit 28 May 1892, Szovitz — there confused with *P. dubium*, with alien petals pasted on; stem with bristles. Western Karabakh, near Sultankent, northeast slopes, fruit VIII, Hohenacker, confused with *P. macrostomum*; with petals of this species pasted on. Gen. distr.: Bal.-As. Min. (Asia Minor). Described from Asia Minor: Merzifon, Paphlagonia, Mamissadjian Pl. Or. No. 451. Type in Leningrad.

642 Note. N. A. Bush refers all reported specimens to *P. dubium* and its var. *laevigata* Elk., but they are distinguished from *P. laevigatum* by nearly bipinnate leaves with irregularly lacerated lobes and lobules. This independent variety, confined to the southern part of Transcaucasia and Asia Minor, appears to be geographically isolated from the Ciscaucasian and southern Ukrainian *P. laevigatum*. These specimens, however, are unsatisfactory so that additional study of the species is necessary.

47. *P. chelidoniifolium* Boiss. et Buhse in Nouv. Mem. Soc. Nat. Mosc. XII (1860) 11; Boiss., Fl. Or. I, 114; Fedde in Pflzr. IV, 104 (1909) 310 (excl. var. *tenuisectum* Fedde et Bornm.). — Ic.: Boiss. et Buhse, l. c., tab. III, f. 1. — *P. laevigatum* C. A. M. Verzeichn. Pfl. Cauc. No. 1564, non M. B.

Annual, glabrescent, with isolated spreading bristles on petioles, stems, and lower side of large veins and small, isolated appressed bristles on peduncles and buds; stems rather slender, angular, erect, 30–50 cm, branches declinate, with slender branches; leaves delicate, membranous, with long, slender, petioles blades lyrate-pinnatisect; lateral segments 1 or 2 (3) pairs, remote, oblong or ovate, entire or frequently lacerated, acutely-toothed, terminal segment much larger than the lateral, 1.5–4 cm long, rounded-ovate or ovate, obscurely 3-lobed or dissected into 3 lobes, with large acute teeth; lowermost leaves often without lateral segments, uppermost leaves with dissected terminal segment, i.e., pinnatisect; sometimes all leaves with dissected terminal segment, i.e., not characteristically lyrate dissected; peduncles very slender, slightly flexuous, 20 cm long. Flower buds ca. 10 mm long, glabrescent, ovate; petals ca. 1.5 cm long, obovate, usually not overlapping, pale red, with nearly black basal spot; filaments black, filiform; stamen girdle rather broad; capsules glabrous, small, (5) 6–7 mm long, obovate or obconical, tapering into a very short pedicel; disk slightly convex, scarious with obtuse, slightly decumbent scarious teeth; rays 5–7, rather wide. April–May. (Plate XLI, Figure 4).

Shrubs and fields. — Caucasus: E. Transc. (Mugan), Tal. (Lenkoran).
Gen. distr.: Iran. (N. Iran). Described from Gilan. Type in Geneva.

48. *P. arenarium* M. B., Fl. taur.-cauc. III (1819) 364; Ldb., Fl. Ross. I, 89; Boiss., Fl. Or. I, 112; N. Busch in Fl. cauc. crit. III, 4, 30; Fedde in Pflzr. IV, 104, 320. — *P. dubium* var. *arenarium* Elk., Tent. Mon. Papav. (1839) 26. — *P. rhoeas* var. *arenarium* Schmalh., Fl I (1895) 36. — Ic.: Garden (1919) 531 (poor). — Exs.: Herb. Fl. Cauc. No. 358.

643 Annual; stem angular, low, usually branching or erect, simple, sparsely short-villous, often becoming red; plant 40–50 cm tall, with mostly long, slender, erect peduncles usually longer than stem, leaves diffusely hispid, bi- or tripinnatisect into oblong-linear or linear obtuse lobes; peduncles 25 cm long, slender with short appressed bristle. Young flower buds densely pubescent, ovate; mature buds oval, 12 mm long, with 2 small (ca. 1 mm long) erect horns and sparse, short, appressed apical bristles; corolla large, petals 4 cm long, broad, bright red, with a rounded or oblong black basal spot; stamens numerous, filaments slender, black; anthers oval, bluish; capsules small, 10–15 mm long, glabrous, smooth, glaucescent, obconical-clavate, gradually tapering but not pedicelled; disk pyramidally ascending at first, later nearly flat, scarious, with broad-margined rays with obtuse overlapping teeth; rays 7–9. April–May. (Plate XLII, Figure 6).

Stony and clayey slopes, semidesert, desert and steppe zone. — European part: L. V.; Caucasus: Cisc. (eastern part: Tersk, Stavropol), E., S. and (rarely) W. Transc., rarely Tal. **Gen. distr.:** N. Iran. Described from Terek. Type in Leningrad.

Note. *P. arenarium* has a rare form, with spreading-hairy peduncles (for example, Mil'skaya Steppe, sands of Shirin-Kum, 18 April 1907 Shelkovnikov). Contrary to Fedde's view (l. c.), *P. arenarium* does not occur in Central Asia.

49. *P. bipinnatum* C. A. M. in Verzeichn. Pfl. Cauc. (1831) 175; Ldb., Fl. Ross. I, 88; Boiss., Fl. Or. I, 113; N. Busch in Fl. cauc. crit. III, 5, 32; Fedde in Pflzr. IV, 104, 303. — Exs.: Herb. Fl. Cauc. No. 359.

Annual; stem tall, with peduncles to 50 cm high, branching from rootstock or reduced, inconspicuous, sparsely hispid, spreading; leaves diffusely crisply hispid, bipinnatisect; segments broad, petiolate or sessile, oblong or ovate, pinnately incised or dissected into oblong-lanceolate or linear lobes terminating in a bristle; fruiting pedicels elongated, slightly flexuous, sparsely covered with long, horizontal, rigid bristles. Flower buds ca. 15 mm long, oval, entirely without horns, with scarce rufous or white, rigid, recurved bristles; petals large, 6 cm long, red, with large basal black spot; capsule glabrous, large, 15–20 mm long, obovate-clavate, gradually tapering into a pedicel, rigid-coriaceous, with prominent longitudinal nerves; disk flat, scarious, with 6–10 low rays, with short, blunt overlapping teeth; stamens few, filaments slender, black, anthers dark-blue. April–May. (Plate XLII, Figure 7).

Clayey and stony steppe and semidesert slopes, rare. — Caucasus: E. and S. Transc., Tal. **Gen. distr.:** N. Iran. Described from Talysh (Zuvant). Type in Leningrad.

644 Section 8. **MECONES** Bernh. in Linnaea VIII (1833) 463; Fedde in Pflzr. IV, 104 (1909) 338 (ex p.). — Annual; large, glaucous, glabrescent plants; leaves large, amplexicaul, entire, dentate or lobate; filaments thickened above middle; capsules usually broad, pedicelled; disk flat, scarious, with low, not ascending rays. Chromosome number [$n =$] 11. — Two species, very closely allied to *P. somniferum* L. and *P. setigerum* DC.

1. Rays 8–12 (–20). Glabrous or with very sparse bristles. Leaves slightly lobate. Diploid, chromosomal number $n = 11$ 50. *P. somniferum* L.
- + Rays 7–8. More bristly, with bristles on pedicels, leaves, and sepals. Leaves deeply lobate, lobes terminating in a bristle, (tetraploid). Chromosomal number $n = 22$ (tetraploid) *51. *P. setigerum* DC.

50. *P. somniferum* L. Sp. pl. (1753) 508; Boiss., Fl. Or. I, 116; N. Busch in Fl. cauc. crit. III, 4, 37; Fedde in Pflzr. IV, 104, 338. — Ic.: Rchb. Ic. Fl. Germ. III, tab. XVII, f. 4481.

Annual, glaucous, 1–1.2 m tall, few-branched; hairs either absent or few, on pedicels and veins of leaves; lower leaves short-petioled, gradually broadening into blade; upper leaves sessile, amplexicaul; blade oblong, quite glaucous, uneven, 10–30 cm long, strongly serrate-dentate or margin incised-lobate, sharp-toothed; pedicels long, thick, glabrous or with spreading bristles. Flower buds 1.5–3 cm long, glabrous, coriaceous, ovate-oval, obtuse; petals 10 cm long, variously colored, usually violet or white, often red or white; spot violet or yellow or white; filaments dark or light, clavately-thickened beyond middle, anthers linear-oblong; capsule large, 2–7 cm long, spherical or barrel-shaped, abruptly tapering into a distinct, more or less long pedicel; disk flat, scarious, distinctly and deeply dentate; rays (5–) 8–12 (–20). May–August.

Weedy places, grows wild. — Throughout the USSR, up to 60°N.

Note. *P. somniferum* is not known in the wild state. Its cultivation dates back to prehistoric times and, in all probability, began by Darwin's "unconscious selection" of wild-growing *P. setigerum* DC., in the Mediterranean countries. Since then there have been bred numerous varieties of cultivated poppy with black, violet, gray, or white seeds, with capsules of various forms, with simple and double flowers, with more or less incised or even lacinate petals, and with red, pink, violet, and white flowers.

645 **Economic importance.** *P. somniferum* is edible; its seeds, which contain 40–56% fatty oil, (Wehmer) are used in baking; it is a fodder plant since its oilcake, prepared as mash, makes excellent forage for young cows; it is also an ornamental plant. Lastly, and most important, it is a medicinal plant; "Fructus Papaveris immaturi." The unripe dried poppy fruits (seeds removed) contain morphine, narcotine, papaverine, traces of meconic acid, etc.; the seeds, particularly of the white varieties, contain no morphine. The most important product of the poppy is opium, which accounts for its extensive cultivation in Kirgizia (Karakol District. Opium is the dried juice obtained from annular or spiral incisions into the base of the unripe capsules. In China and elsewhere raw opium is smoked or chewed for its narcotic effect; in European medicine the following alkaloids, which it contains up to 20–25%, are extracted: morphine, apomorphine,

codeine, papaverine, laudanine, narcotine, rheadine, and others — a total of 18. All these drugs are analgesic, sedative, antispasmodic, and soporific. Opium and the alkaloids extracted from it are also used in the treatment of stomach ailments. See N. A. Bazilevskaya in Trudy Prikl. Botan., XIX, 2 (1928) 95 for the varieties and forms of the opium poppy.

*51. *P. setigerum* DC., In DC. et Lam., Fl. Franc. VI (suppl.) (1815) 585; Fedde in Pflzr. IV, 104 (1909) 342. — *P. somniferum* var. *setigerum* Elk. Tent. Mon. Papav. (1839) 30; Boiss., Fl. Or. I, 116; N. Busch in Fl. cauc. crit. III, 4, 37; N. Bush, Fl. Sib. i Dal'n. Vost., 18. — Ic.: Deless., Ic. pl. sel. II, tab. 7; Bonnier, Fl. III. France I, tab. 24.

Annual, very similar to preceding but smaller, 30–60 cm high, more slender; stem more or less bristly; leaves less amplexicaul, more deeply and acutely lobate, lobes serrate-dentate, terminating in a bristle, bristly along veins; pedicels long, covered with spreading bristles. Flower buds 1.5–2 cm long, ovate-oval, bristly at summit; petals larger, violet; capsules as in *P. somniferum* but slightly smaller, with a 5–8-rayed disk.

Not encountered in the USSR, but reported by N. A. Bush for the Crimea and the Caucasus, where perhaps, it may be found. Gen. distr.: Med. Described from Iles d'Hyères (near Toulon). Type in Geneva.

Doubtful species of unknown affinity.

52. *P. talyschense* Grossh. in Monit. Jard. Bot. Tiflis, livr. II–III (1919) 44. — Ic.: tab. VI, f. 9–12 (leaf and capsule).

646 Perennial; stems numerous, 40–50 cm high, branching at base. Entire plant with spreading hairs; leaves oblong-oval, 10–15 cm long, 3–5 cm broad, irregularly deeply dissected, lower and cauline leaves subsessile or with very short petiole, hispid, bristles at ends of segment longer and more rigid; flowers solitary on long, stout pedicels, 15–25 cm; filaments slender, subulate; capsule oboblong-ovate, tapering below (subpyriform), 12–15 mm long, 7–9 mm broad; disk convex, the tips of the 6 or 7 stigma rays semi-rounded, longer than disk.

Caucasus: Tal. Endemic. Described from Kyzylurda, at 2,400 m, near Post No. 1, in herbaceous slopes, 24 July 1917, Grossheim. Type in Tbilisi.

Note. This poppy is referred to section *Pilosa* Prantl, in particular to the series of East Mediterranean species which comprises *P. lateritium* C. Koch, *P. monanthum* Trautv., *P. oreophilum* Rupr., and *P. ramosissimum* Fedde; from the latter it is readily distinguished by its larger growth and non-spreading, branching stem. From all the other species it is distinguished first and foremost by the oblong-oval shape of leaves, the nonlanceolate or linear-lanceolate short petioles, or absence of petioles. In addition, it is to some extent distinguished from *P. lateritium* by: 1) longer and thicker pedicels, and 2) by the form of the capsule and the 5 or 6-rayed stigma of *P. lateritium*, with short lobes. From *P. oreophilum* it is distinguished by: 1) not caespitose stem base, and 2) by the form of the capsule and stigma, which has the same shape in *P. oreophilum* as in *P. lateritium*. Lastly, from *P. monanthum* — to which it is similar in the shape of the capsule — it is distinguished by: 1) branching and leafy stems; (in *P. monanthum* the stems are solitary and all leaves are radical), and 2) by shorter pedicels. I have never seen

specimens of this very enigmatic species, which should perhaps be included not in section *Pilosa* but in the section of annuals; it proves to agree with *P. bipinnatum* C. A. M.

647 Subfamily 3. **FUMARIOIDEAE** A. Br. in Aschers., Fl. Prov. Brandenburg I (1864) 48 excl. *Hypocoidae*; Prantl. Kündig in Engl., Natürl. Pflanzenf. III, 2 (1891) 197. — Sepals small, triangular or oblong, squamiform, sometimes inconspicuous or obsolete, not enclosing the remaining parts of the flower up to the time of flowering; petals 4, in two whorls, outer petals either equal (symmetrical) with a proximal spur or a saccate extension, or flowers zygomorphic and only the upper petals with a distinct spur; inner petals usually adhering apically, prominently keeled dorsally; stamens 2, opposite outer petals, distally tripartite, bearing 3 anthers of which usually only the middle bilocular; stigma flattened, always lobate, very variable; fruit a short, siliquiform capsule dehiscing by 2 valves and leaving behind
aseptate placentas, rarely a 1-seeded nutlet; seeds usually black, glossy, often with an appendage. Glabrous herbs, with ternate or pinnate leaves, without milky juice.

Tribe 1. **DICENTREAE** Bernh. in Linnaea VIII (1833) 467. — Inflorescence dichasial, cymose; flowers symmetrical; both outer petals with spurlike or saccate nectaries. Fruit a capsule.

Genus 557. **ADLUMIA** * RAF.

Raf. Med. Rep. II, 5 (1808) 352 et in Desv. Journ. Bot. 2 (1809) 169

Sepals finely scarious, triangular-oblong, caducous in bud; outer and inner petals fused to two thirds to three quarters of their length into a slightly cordate basal tube, as in *Nymphaea*, due to the small saccate extensions, which are spongy in fruit; the free part of the petals becomes pink-violet, triangular-ovate, acute in outer petals, cochleariform, with an orbicular flat apex in inner petals, the free part of the filaments long, filaments subconnate; stigma bi-lobed, with obtriangular lobes; fruit a capsule; seeds black, glossy, not punctate, suborbicular, without appendages. — Climbing herbaceous plants.

1. *A. asiatica* Ohwi in Tokyo Bot. Mag. XLV (1931) 387. — *A. cirrhosa* Kom. in Fl. Manchzh. II, 343, non Raf.

Perennial, liana; stem slender, flexuous, to 3 m high, winding among shrubs by means of tendril-like petioles; leaves with short petioles, thrice ternate; the middle segment on long slender petiolule functioning as a tendril; lateral segments on short petiolules divided into 2–3 lobules; lobules delicate, flat, obliquely ovate or oblong, obtuse; inflorescence

* After John Adlum, a Washington gardener.

pseudoracemose, cymose in leaf axils, much shorter than leaves, 3–10-flowered, with small scarious bracts and bracteoles; flowers large, ca. 17 mm long, drooping; lower connate part of corolla spongy, white, with 4 narrow wings, almost tetragonous in cross section; corolla opens at base and remains attached to ripe capsule; capsule linear, 17 mm long, 3 mm broad, flat, with slender valves and placentas; seeds ca. 1.5 mm across. (Plate XLV, Fig. 6, a-d).

Far East: Ze.-Bu., Bureya River basin, southwest of the village of Bakharevaya (Dokturovskii), Selemdzha River basin, Bysa River, coniferous forest edge (Kuznev). Gen. distr.: Jap.-Ch. (Korea, Manchuria). Described from North Korea. Type in Tokyo.

Genus 558. **DICENTRA*** BERNH.

Bernh. in Linnaea VIII (1833) 468.—Bicuccula Adans. Fam. d. Plant. II (1763) App. 23.—Diclytra Borckh. in Roem. Arch. I, 2 (1797) 46.—Diclytra DC., Syst. II (1821) 107.

Sepals triangular-ovate, retained at flowering; petals free, not connate, each outer petal with a spur or (in the USSR) with a basal saccate extension; inner petals keeled; fruit a capsule. — Perennial herbs, with variously shaped rootstock.

1. *D. peregrina* (Rudolphi) Fedde, Repert. sp. nov. IX (1911) 238; Bush. in Fl. Sib. i Dal'n. Vost. I, 28.—*Fumaria peregrina* Rudolphi in Mém. Ac. Sc. Pétersb. I (1809) 379.—*F. tenuifolia* Ldb. in Mém. Acad. Pétersb. V (1812) 550.—*Diclytra tenuifolia* DC. et *D. lachenaliaeflora* DC., Syst. II (1821) 110 et 111.—*Dicentra tenuifolia* et *lachenaliaeflora* Ldb., Fl. Ross. I (1842) 97.—Ic.: Rudolphi, l.c., tab. 18; Bush., l.c., 29.

Perennial; rootstock short, cespitose, producing numerous strong, slender roots; leaves all radical, glaucous, with long slender petioles, thrice ternately or pinnately dissected; blade short, small, ovate, segments with short petioles, lobes sessile, approximate, lobules crowded, linear or linear-oblong, rigid, often canaliculate, acute, furcately bipartite; flower stalks slender, nearly twice as long as leaves; inflorescence cymose, small, 2–5-flowered, short, pseudoracemose, with small scarious bracts and bracteoles. Flowers ca. 20 mm long; sepals broadly ovate, scarious, ca. 3 mm long; corolla violet-pink; outer petals strongly expanded proximally and thus corolla with base as in *Nymphaea* with short, broad, almost rounded projections, ribbon-like distally, barely expanding at apex, arcuately curved laterally; inner petals with ribbon-like blade, somewhat broadened at apex, dark violet, with a high inflated dorsal wing, blade three times as long as claw; stigma bilobed, with revolute hatchet-shaped lobes; capsule oblong, thinly scarious, ca. 15 mm long, long-acuminate, with a long, persistent style; seeds glossy, black, not punctuate, oblong, reniform, pointed with a small sessile aril in a concavity ca. 1.5 mm long. June–July. (Plate XLV, Fig. 7, a, b).

Stony and sandy outcrops. — Arctic; Chuk., An.; Far East: Kamch., Okh., Uda, Uss., Sikhote-Alin blds. Endemic. (very close to *D. pusilla*

* The name refers to the 2 spurs or 2 saccate projections of the petals.

S. et Z. in Japan). Described from the Selenga River. Type in Leningrad.

- 649 Tribe 2. **CORYDALEAE** Rchb., Handb. d. natürl. Pfl. syst. (1837) 264. — Monocentreae Bernh. in Linnaea VIII (1838) 468 p. p. — Flowers zygomorphic, with one spur formed by the upper outer petal; fruit a capsule; flowers in racemes not in dichasial (cymose) inflorescences.

Genus 559. **CORYDALIS** * MEDIC.

Medic. Philosoph. Botanik (1789) 96 emend. DC. Syst. II (1821) 113, nec Vent. Choix. p. et tab. 19 (1803). — Capnoides** Adans. Fam. pl. (1763) 431.

Flowers in simple or branching racemes; corolla zygomorphic, with one spur produced by the outer superior petal, yellow or pink or bluish violet. Sepals often small, scarious, soon caducous; fruit a capsule dehiscing by 2 usually slender, flexible valves; rarely capsule bladderly-inflated, indehiscent; seeds usually black, with a scarious appendage (caruncle), very rarely without appendage; herbs, without trailing stem; root often tuberous.

Economic importance. Some species of *Corydalis*, such as *C. seversovii*, the allied *C. nobilis* and some others, are suitable as ornamental plants.

Key to Sections

1. Rootstock tuberous. Cotyledon single p.497 (subgenus *Capnoides* DC.) 2.
- + Rootstock not tuberous, elongated, branching. Cotyledons 2, p.681 (subgenus *Capnoides* DC.) 6.
2. Stems without squamiform scarious leaves in lower part, covered with radical hairs for some distance from tuber. Tuber more or less large, perennial, becoming more or less hollow with age, producing adventitious roots over entire surface. Cauline leaves 2, rarely 3 3.
- + Stem bearing 1—3 squamiform, scarious leaves in lower part 4.
3. Cauline leaves 2, opposite, only in one of the 10 species of the section there is, besides the cauline leaves, an additional reduced leaf borne above the cauline leaves, and reduced (p.498) 1. *Leonticoides* DC.
- + Cauline leaves 2 alternate (p.503) 2. *Radix cava* Irm.
4. Squamiform leaf in lower part of stem always single large, recurved; cauline leaves 2, tuber spherical, small, replaced each year by a new tuber developing inside the old one. Adventitious roots are produced only from lower pole of tuber (p.506). 3. *Pes-gallinaceus* Irm.

* From the Greek *koris* — helmet, referring to the shape of the flower.

** The International Botanical Congress has retained *Corydalis* as *nomen conservandum*, instead of *Capnoides*, a *nomen rejiciendum*

- 650 + Squamiform leaves in lower part of stem 1—3, not recurved, appressed to stem and smaller. Leaves usually more than 2, most often 3 or 4. Tuber of irregular form, not spherical, conical or cylindrical, with horn-shaped appendages branching 5.
5. Tuber small, with horn-shaped appendages and creeping rhizome. Adventitious roots are produced over the entire surface of the tuber. Leaves 3 or 4, with long lobes. Bracts incised (p. 520) 5. *Ceratotuber* M. Pop.
- + Tuber larger, conical or cylindrical, divided above or below into 2 or a few segments, rarely with obscure segments. Bracts entire (p. 516) 4. *Dactylotuber* Rupr.
6. Perennials, with short rootstock producing adventitious roots 7.
- + Annuals or biennials 10.
7. Small alpine herbs, 8—15 cm high. Scales at apex of rootstock relatively larger, the inner fleshy. Rootstock short, with large adventitious roots. Corolla small, 15 mm long. Leaves ternate. Capsule dehiscent (p. 535) 9. *Oreocapnos* M. Pop.
- + Plants larger, sometimes very large, scales at apex of rootstock scarious or coriaceous, not fleshy. Leaves pinnatisect. Flowers 15—40 mm long. 8.
8. Rootstock brown, cylindrical or nearly tuberlike, bearing scales, thickened above, producing slender adventitious roots. Scales of underground buds broad, suborbicular, coriaceous. Radical leaves one or absent. Stigma square, shaped like an elongated tetragon. — Large plants of the Far East, corolla red or violet, capsule dehiscent (p. 521) 6. *Archaeocapnos* M. Pop.
- + Rootstock stout, short, fibrous, passing into a deep, vertical fibrous root without adventitious roots. Scales of underground buds triangular, scarious. Stigma not tetragonous, shorter, of a different shape. Radical leaves few. 9.
9. Capsule dehiscing by valves, not inflated. Corolla yellow (p. 524) 7. *Calocapnos* Spach.
- + Capsule inflated, vesicular, not dehiscing. Corolla whitish with violet tinge (p. 534) 8. *Oocapnos* M. Pop.
10. Larger, more robust biennials, with a radical rosette of leaves from the center of which there emerges a flower-bearing stem or stems. All leaves, or at least the radical, pinnate 11.
- + More slender, small, biennial or annual herbs. Leaves ternate (p. 537) 12. *Microcapnos* M. Pop.
11. Capsules spreading or pendulous, moniliform. All leaves pinnate (p. 536) 10. *Sophorocapnos* Turcz.
- 651 + Capsules erect, not moniliform, very long, narrowly linear. Only radical leaves pinnate, cauline leaves ternate (p. 537) 11. *Glaucæ* M. Pop.

Subgenus 1. **CAPNITES** DC., Syst. II (1821) 115 (as a section). — Genus *Bulbocapnos* Bernh. in *Linnaea* VII (1832) 604. — Root tuberlike. Cotyledon one. Leaves often ternate, rarely pinnate.

Section 1. **LEONTICOIDES** DC., Syst. II (1821) 114.—Subgenus *Corydalis* C. Koch in *Linnaea* XV (1841) 252.—Genus *Cryptoceras* Schott in *Oesterr. Bot. Wochenb.* IV (1854) 121.—Cauline leaves 2, opposite; tuber generally large, perennial, spherical, flattened spherical, short obconical, deep in the ground, becoming hollow with age; adventitious roots produced at different parts of tuber; stems numerous, the lower, subterranean part covered with hairlike roots, above ground short, simple; leaves usually at soil surface, subsessile, ternate, rarely pinnate; bracts entire. In *C. macrocentra* there is one reduced cauline leaf with pectinate-incised bracts besides the upper pairs of opposite leaves.

1. Bracts pectinate-dissected. Upper pair of opposite leaves close to a single reduced leaf that is similar to the others. Corolla large, ca. 30 mm long, abruptly arcuate, with slender, antrorsely curved spur. Leaves 3- to nearly 4-sect, with linear-oblong lobes (series *Macrocentrae* M. Pop.) 1. *C. macrocentra* Rgl.
- + Bracts entire. Cauline leaves only 2, opposite, rarely in *C. darwasica* with one additional reduced leaf 2.
2. Corolla 16–25 mm long, usually of different shades and intensities of pink (series *Rutifoliae* M. Pop.) 3.
- + Corolla 30–45 mm long, yellow, rarely pink, with very long, erect spur (series *Longiflorae* M. Pop.) 7.
3. Leaves thrice ternate, lobules obovate, short, blunt, 2–3-lobed, the overlapping lateral lobes markedly smaller than the median lobe 4.
- + Leaves once or thrice ternate, with entire or lobate segments or lobes, median lobe large, lateral lobes smaller 5.
4. Limbs of outer petals large, somewhat longer (by 4–5 mm) than those of inner petals. *Darvaz. Baldzhuan* 2. *C. darwasica* Rgl.
- + Limbs of outer petals slightly longer than those of the inner. Armenia, Nakhkrai 3. *C. persica* Cham. et Schlecht.
5. Lobes of twice ternate leaves elliptical, acute. Armenia. Nakhkrai 5. *C. erdelii* Zucc.
- + Lobes of once or twice ternate leaves obtuse, oval or obovate. Central Asia 6.
6. Raceme barely overtopping leaves. Pedicels, at least the lower, longer than the bracts. Spur suberect, slender. Flowers small, 16–20 mm long. Leaves ternate. *Kopet Dagh.* 4. *C. chionophila* E. Czerniak.
- + Raceme strongly overtopping the leaves, narrow, with very short pedicel. Corolla larger, 18–25 mm long. Spur erect, upcurved, slender or saccately extended. Leaves once, more often twice ternate. Pamir-Alai area, Tien Shan, Tarbagatai 6. *C. ledebouriana* Kar. et Kir.
7. Corolla pink. Inner petals with broad apical notch and 2 acute marginal teeth. Raceme markedly overtopping leaves. Leaves twice ternate 7. *C. popovii* Nevski.
- + Corolla yellow, grayish at end of flowering (nearly violet when dry). Inner petals with small, apical notch, obtusely-toothed. Raceme barely overtopping leaves 8.

8. Leaves twice ternate, lateral lobes of each segment and especially lateral lobules of each lobe markedly smaller than the median. Pedicels shorter, not longer than 15–20 mm 8. *C. severzovii* Rgl.
- + Leaves once ternate, lateral segments always entire, median segment of 3 lobes. Segments and lobes oval. Pedicels longer, the lower up to 40 cm long. 9. *C. aitchisonii* M. Pop.
- + Generally similar to preceding species, but segments entire, orbicular 10. *C. nevskii* M. Pop.

1. *C. macrocentra* Rgl. in A. H. P. VIII (1884) 694; Prain in Bull. Herb. Boiss., ser. I, VII (1899) 179.—Ic.: Rgl., l. c., tab. 16, f. a-f; Prain, l. c., fig. 10.

653 Perennial; tuber large, irregularly angular in form, the young tuber often seems to be short-conical; leaves sessile or subsessile, thrice ternate; segments long petioled, the lobes—especially the median—also long-petioled, lobules—except for the median—subsessile, broad, deeply incised into oblong, nonoverlapping, acute lobes; median lobes and lobules slightly larger than the lateral; the elongated petioles of median lobes and lobules make the leaves appear pinnate; on a pedicel overtopping the pair of opposite leaves there is a reduced leaf, similar to the lower leaves; racemes (stems) 1–3, from one pair of leaves. Racemes slightly overtopping the leaves, not dense, each with 3–10 flowers; bracts broadly cuneate, pectinate-incised, with slender unequal lobules; pedicels slender, long, longer than bracts, the lower up to 20 mm long; sepals 1–1.5 mm broad, dentate, greenish; corolla long, ca. 30 mm pinkish, abruptly curved, lips of outer petals rather broad, large, obtuse, noticeably longer than inner petals, gibbosity in lower part of lower outer petal conspicuous, obtuse; spur twice as long as the petal, slender, arcuately ascending, its tip slender, erect or slightly recurved; capsules pendulous or declinate, short, narrow, acute.

Grows at 900–1, 500 m.—Centr. Asia: Pam.—Al. (western Pam.—Al., Kulyab, Boldzhuan). Endemic. Described from Boldzhuan. Type in Leningrad.

2. *C. darwasica* Rgl. ex Prain in Journ. Asiatic Society of Bengal. LXV, II (1896) 20; Bull. Herb., Boiss., ser. I, VII (1899) 166; Korsh. in Bull. Acad. Pétersb., sér. 5, IX, 405.—Ic.: Prain, l. c., fig. 1.

Perennial; tuber large, often short conical or very irregular in outline, angular, adventitious roots confined to lower part; leaves green, sessile or subsessile, thrice ternate, median segments, lobes and lobules conspicuously larger than the lateral; segments and lobes rather long-petioled; lobules, especially the median, with short but conspicuous petioles, ovate or obovate, broad, incised into 3–2 overlapping lobes or teeth, the lateral smaller and more acute than the large median lobe, with a subtruncate or short-acuminate or obtuse, pointed tip. Raceme one, rarely 2–3 from one rosette; exceptionally pedicel with one leaf similar to the lower leaves but smaller. Raceme loose, barely overtopping leaves; bracts nearly from base of peduncle, entire, large, rhombic, obovate or ovate, acute or obtuse; pedicels slender, spreading, nearly as long as bracts, the lower up to 15 mm long;

sepals minute (ca. 1 mm), dentate, elongate, to 2 mm or inconspicuous; corolla 18–20 mm long, distinctly recurved, pink, with a dark spot on lower lip and at tip of inner petals; limbs of outer petals very broad, strong, denticulate, the upper notched at apex, obovate, the lower obtuse, both markedly (by almost 5 mm) longer than inner petals; gibbosity in lower part of lower outer petal conspicuous; spur of upper petal slightly or strongly arcuately ascending, slender, or hamately curved, obtuse, as long as outer petal; capsules pendulous and spreading small, acute.

At heights of 1,000–2,000 m. — Centr. Asia: Pam. — Al. (western Pamir-Alai area, Boldzhuan, Darvaz), western T. Sh. (Chimgan, Ugam). Endemic. Described from Darvaz. Type in Leningrad.

- 654 3. *C. persica* Cham. et Schlecht. in Linnaea I (1826) 567; Boiss., Fl. Or. I, 127 (p.p.); Prain in Bull. Herb., Boiss., VII (1899) 147. — *C. rutae-folia* N. Busch in Fl. cauc. crit. III, 4, 62 (p.p.), non Sibth. et Sm. —

Perennial; leaves glaucescent, sessile or subsessile, thrice ternate; segments rather long-petioled, the median larger; lobes with distinct conspicuous petioles, petioles of the lateral 2–8 mm long, and of the median lobe to 20 mm long; lobules sessile or subsessile, broad, obovate, obtuse, incised into 3–2 overlapping, rarely remote lobes, the median much larger than the lateral; median segment of leaf and median lobe of each segment also much larger than the lateral; raceme barely overtopping leaves, 4–10-flowered, dense at first, becoming remote; bracts entire, ovate or oblong, acute; pedicels shorter than bracts, the lower to 15 mm long; sepals small, 1 mm broad, scarious, denticulate. Corolla 20–25 mm long, slightly recurved, suberect or curved, pink; lips of outer petals small, obtuse; with conspicuous basal tubercle on lower petal; spur slender, 1.5 times as long as the petal, at first slightly arcuate (at back of upper petal), becoming suberect, dropping slightly so that flower rather sigmoid, rarely arcuate; capsules pendulous, small, pointed. (Plate XLIII, Figure 3).

Alpine zone. — Caucasus: S. Trans. (Nakhichevan ASSR). Gen. distr.: Iran. (Astrabad Province of Northern Iran). Described from Northern Iran. Type in Berlin.

Note. This species agrees fully with Gmelin's specimen, preserved in the Herbarium of the Botanical Institute of the Academy of Sciences, Leningrad, which — unknown to Prain — is apparently the cotype (the type is at the Berlin Botanical Garden). It is labelled "*Orchis tripetala*" and is in an excellent state of preservation, whereas the leaves of the Prain specimen are damaged. Its flower is suberect and not arcuate, as described and sketched by Prain. Prain's mistake is obviously due to his not having seen the Berlin specimen; or, perhaps, he saw only one flower, sent to him by Professor Urban, and this may have been abnormal, mutilated, or picked from another specimen.

4. *C. chionophila* E. Czerniak in Bull. Jard. botan. princip., Leningrad, XXIX (1930) 138. — Ic.: E. Czerniak, l. c., tab. 2.

655 Perennial, plant small; tuber of medium size, ca. 25 mm in diameter, slightly flattened; leaves glaucous, subsessile, once ternate, segments rather short-petioled (3–15 mm long), lateral segments entire, ovate-oblong or obovate, obtuse or acute, 8–20 mm long; median segment ternate, of 3 ovate-oblong, sessile, short-petioled, entire lobes; in the smaller specimens, all segments entire. Raceme 3–8-flowered, short, barely overtopping leaves; pedicels slender, rather long, the lower to 15 mm long, shorter than

the oblong, large, acute bracts; sepals small, less than 1 mm long; corolla 10–20 mm long, slender, white or pink, with raspberry-colored spot at apex of petal, limb small, obtuse, with sharp mucro; lower outer petals with inconspicuous basal gibbosity; basal spur slightly arcuately ascending, slender, more or less curved distally or else erect, rarely corolla strongly arcuate; capsules pendulous, small, elliptic, acute. April–May.

Stony and clayey slopes in the subalpine mountain zone. — Centr. Asia: Mtn. Turkm. (central and western Kopet Dag). Endemic. Described from Mount Chapan. Type in Leningrad.

5. *C. erdelii* Zucc. in Abh. Bayr. Acad., München III (1840) 252. — *C. rutaefolia* Boiss., Fl. Or. I, 127 (ex p.); N. Busch in Fl. cauc. crit. III, 4, 62 (ex p.). — *C. alpina* C. Koch in Linnaea XV (1841) 252, non J. Gay. — *C. modesta* Prain in Bull. Herb. Boiss., VII (1899) 168. — Ic.: Zucc., l. c., tab. 9, fig. 2, 3; Prain, l. c., f. 4.

Perennial; tuber ca. 20 mm in diameter, angled-spherical; leaves sessile or subsessile, twice ternate, glaucous; segments short-petioled (6–15 mm); lobes sessile or very short-petioled, entire, lanceolate or oblong, acute, 3 cm long, rarely secondarily incised, with 1–2 small, lateral, lanceolate, acute lobules or teeth; rarely (in smaller specimens) lateral segments only incised, with 1–2 small, lanceolate, lateral lobes, not dissected to base; raceme slightly overtopping the leaves; bracts rather large, oblong or ovate, acute; pedicels long, to 20 mm, the lower ones slightly longer than the bracts, thus the raceme rather loose, broad, 5–10-flowered; sepals very minute, edentate, sometimes inconspicuous scales; corolla rather large, light- or dark-violet-pink, 20–25 mm long, suberect or slightly arcuate; limbs of outer petals acute, small, slightly longer than the inner petals, distinctly darker than the rest of the corolla; lower petals somewhat protruding at middle; spur obtuse, 1.5 times longer than petals, slightly arcuate, slender, stout or stoutish, upright, with recurved apex; capsule short, acute, pendulous or inclined. (Plate XLIII, Figure 4).

Caucasus: S. Transc. (Yerevan, Nakhichevan, Mount Il'va near Leningrad). **Gen. distr.:** Arm. -Kurd., Bal. -As. Min., E. Med. (Syria). Described from Mt. Lebanon.

6. *C. ledebouriana* Kar. et Kir. in Bull. Soc. Nat. Mosc. XIV (1841) 377; Ldb., Fl. Ross. I, 745; Prain in Bull. Herb. Boiss., VII (1899) 176). — Ic.: Gartenflora XXVIII, tab. 981; Bot. Mag. CXIII, tab. 6946.

356 Perennial; tuber large, to 5–6 cm across, flattened, turnip-shaped; leaves glaucous, sessile or subsessile, once or twice, rarely 3 times ternate; segments rather short-petioled, lobes — with the exception of the median — very short-petioled or sessile; lateral segments large, to 2–3 mm long, often simple, entire, oval, obovate or oblong, obtuse; median segment of 3 large lobes, the median larger (sometimes markedly so) than the lateral; lobes entire or proximally with 1–2 very small acute lobules; in the larger specimens all segments ternate-divided; raceme much overtopping the leaves, narrow, often with remote flowers; bracts entire, oblong or ovate, acute; pedicels short, half the length of the bracts; sepals very small, less than 1 mm long, scarious. Corolla pink or violet-pink, very variable in size and form, sometimes narrow, erect, with erect slender or stoutish spur, sometimes arcuate with abruptly ascending, slender or stout spur, sometimes,

very stout-saccate; limb of outer petals dark, violet-brown, small, as long as inner petals; lower outer petal with a more or less conspicuous basal tubercle; spur almost 1.5 times longer than petal; the entire corolla 16–25 mm long, capsules short, broad, oval, ca. 10 mm long, erect or slightly declinate; seeds black, glossy, not punctate, ca. 1.5 mm across, caruncle scarious, mushroom-shaped, spreading, not adhering to seeds. April–June

Clayey and stony slopes of the central zone in patches of melting snow. — Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. Gen. distr.: Iran. (Afghanistan, Hindu Kush), Dzu.-Kash. Described from Tarbagatai. Type in Leningrad.

Note. The outstanding characteristic distinguishing the real *C. ledebouriana* from *C. chinophila* and *C. rutifolia* is the long peduncle, which bears bracts and flowers above the tip of the leaves; however, there are specimens (for example, Alai Range, descending at the south from the Kosh-Karchi Pass. Desyatova No. 1087), which, except for the short pedicels, are indistinguishable from *C. chionophila*. The form with an arcuately ascending stout spur appears to be closely allied to *C. cyrtocentra* Prain, described from Chitral and Gilgit.

7. *C. popovii* Nevski in Schedae, ad. Herb. Fl. As. Med. Fasc. XXI–XXIII (1934) 87. — Exs.: H. F. A. M. No. 570.

657 Perennial, glaucous; leaves almost 3 times ternate, sessile, with obovate, sometimes suborbicular, obtuse, median lobules, the lateral lobules half as long, acute; raceme loose, 2–6 flowered, considerably overtopping the leaves; peduncles to 10 cm; pedicels longer than bracts, 25 mm long, fruiting pedicels recurved; bracts obovate, obtuse or ovate, slightly acuminate, 15 mm long; sepals inconspicuous, truncate. Corolla large, 40–45 mm long, violet-pink, with dark violet, slightly acuminate lips; lower petal with proximal gibbosity lip recurved; spur twice as long as petals, rather stout, suberect, tapering with slightly reflexed tip; inner petals with very apical broad notch, limited on each side by an acute tooth; capsule flattened, broadly ovate, 10–13 mm long, 5–6 mm broad, short acuminate; style long, slender. May–June. (Plate XLIII, Figure 1).

Clayey slopes, middle and upper mountain zones. — Centr. Asia; Pam.-Al. (southwestern spurs of the Gissar Range: Ak-Rabat, Buzgalakhan near Derbent, Kugitang, Chulbair, Tutkaul, Guli-Zindan). Described from Chulbair mountains. Type in Leningrad.

Note. Racemes longer and looser than in *C. severzovii* resembling those of *C. ledebouriana*. The corolla as in *C. sewerzovii* with respect to both size and form, but pink with a dark violet, subacute lip; inner petals broadly notched.

8. *C. severzovii* Rgl. in Bull. Nat. Mosc. XLIII, 1 (1870) 252. — Ic.: Gartenflora XXXI, 97, tab. 1077; Bot. Mag. CXII, tab. 6896.

Annual; tuber medium-sized, 15–30 mm in diameter or larger, angular-rounded; leaves glaucous, membranous, subsessile or sessile, twice ternate; segments with long slender petioles, lobes rather large, short-petioled, subsessile rarely entire, obovate or oblong, obtuse, often 2–3-lobed, median lobes larger than the lateral, sometimes pinnately 5-lobed; raceme with peduncle 5–15 cm slightly overtopping leaves, short, 2–6-flowered; bracts large, obovate, acute, longer than pedicels; pedicels slender, the lower 15 mm long, fruiting pedicel recurved; sepals small, less than 1 mm long, scarious,

dentate; corolla 35–45 mm long, yellow or orange-yellow, sometimes brownish red in blossom, slightly sigmoidal; outer petals with narrow limb, slightly notched, barely longer than the inner; lower petals with slight basal tubercle; spur 1.5–2 times as long as the petals, rather slender, suberect, distally recurved, sometimes hamate, obtuse, inner petals rounded, with small inconspicuous notch; capsules oblong, 10–15 mm long, ca. 4 mm broad, acute, pendulous, with very long slender style; seeds large, ca. 3 mm in diameter, glossy, conspicuously punctate; aril (caruncle) appressed to body of seed, hat-shaped, scarious. March–April.

Clayey slopes, mountains and mountain foothills, lower zone (semideserts). – Centr. Asia: T. Sh. (western), Pam. – Al. (western part of Turkestan Range, Nura-Tau mountain south of Guzar). Endemic. Described from Kara-Tau Mountain. Type in Leningrad.

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9. *C. aitchisonii* M. Pop. sp. nova in Addenda VI, p. 579. – *C. severzovii* β *simplicifolia* Lipsky ex Fedde, Repert. XIX (1923) 224. – *C. sewerzovii* Prain in Bull. Herb. Boiss., VII (1899) 169, fig. 5, non Rgl.

Perennial; leaves less dissected, usually ternate, the segments on long, slender petioles; lateral segments entire, the median repeatedly ternate with entire lobes on conspicuous petioles, segments and lobes large, 2–4 cm long, oblong or oval, obtuse; raceme as in *C. severzovii*, few-flowered, slightly overtopping leaves; bracts very large, similar to leaf lobes, sometimes acute; pedicels very long, the lower longer than the bracts, to 40 cm long, erect, spreading or pendulous; flowers orange-yellow, becoming reddish brown after flowering, shaped as in *C. severzovii*; capsule short, 10–15 mm long, ellipsoid, acute, 3–4 mm broad. April–May.

Clayey and stony slopes, lower mountain zone. – Centr. Asia: Mtn. Turkm. (Kopet Dag, Badkhyz). Described from Badkhyz. – Type in Leningrad.

Note. The plants from Kopet Dag and Badkhyz are very much alike, differing only in that the leaf lobes of the Badkhyz plant are more rigid and fleshy than the delicate and scarious leaf lobes of the Kopet Dag plant; this difference corresponds with the occurrence of this species in the mountain passes of Kopet Dag, which are shady and damp in the spring.

10. *C. nevskii* M. Pop. sp. nova in Addenda VI, p. 579.

Perennial, very similar to preceding species, but all leaf segments entire, slightly smaller and rounded. No other distinguishing features. April. (Plate XLIII, Figure 2).

Stony slopes, under rocks. – Centr. Asia: Pam. – Al. Endemic. Described from Alai Range. Type in Leningrad.

Section 2. **RADIX CAVA** Irmisch in Abhand. naturf. Ges. Halle VI (1869) 273. – *Cavotuber* Rupr., Fl. Cauc. (1869) 54. – Cauline leaves 2, alternate, tuber small or medium-sized, irregularly spherical, perennial, lying deep in the ground, becoming hollow with time owing to partial disintegration of tissues; stem base with root hairs [sic!], without squamiform leaves; adventitious roots produced on various parts of tuber, which, like the stems, also produces radical leaves each year; bracts entire.

1. Outer petals with narrow, sharp tipped limb. Lobules narrow, elongated. Tuber small. Capsule narrow, linear 13. *C. nudicaulis* Rgl.
- + Outer petals with large limb, apically notched. Lobules broad, large. Tuber often medium-sized. Capsule oblong 2.
- 659 2. Corolla pink-violet. Lobules cuneate, distally dentate. Capsule 10–12 mm long, 4–5 mm broad 11. *C. cava* (Mill.) Schweig. et Körte
- + Corolla yellow, rarely pink-yellow. Lobules oblong-elliptic, not cuneate, often entire distally. Capsule 15–20 mm long, 4–3 mm broad 12. *C. marschalliana* (Pall.) Pers.

11. *C. cava* (Mill.) Schweig. et Körte, Fl. Erlang. II (1811) 44; Ldb., Fl. Ross. I, 99; Shmal'g., Fl. I, 40. — *Fumaria bulbosa* a. *cava* L., Sp. pl. (1753) 699. — *F. cava* Mill., Dict. ed. 8 (1768) N. 7. — *C. bulbosa* Pers., Syn. II (1807) 269. — *C. tuberosa* DC., Fl. France IV (1805) 637. — Ic.: Hegi Illustr. Fl. Mitteleur. B. IV, fig. 736–737 et tab. 125, f. 1–1; Bonnier, Fl. III. France I, tab. 27. — Exs.: Fl. exs. Reip. Boh. -Slov. No. 215; Fl. exs. Austro-hung. N. 2073; HFR No. 304.

Perennial; tuber medium sized or large, of irregular form, bearing rootlets over entire surface, gradually decaying internally or proximally, growing above; stem erect, simple, 15–25 cm high, with 2 leaves in upper part; leaves short-petioled; blade small, broad, twice or nearly 3 times ternate; segments long-petioled (lateral segments visibly removed from each other), lobes short-petioled or sessile, large, broadly cuneate, divided nearly from base into 2–3 broad, cuneate, entire or sharp-toothed lobules, tips of lobules or teeth acute; leaf delicate, nearly membranous, glaucescent. Raceme on long peduncle, cylindrical, medium-compact, rather many-flowered; bracts entire, herbaceous, slightly violet, large, oblong or ovate, acute, 2 to 3 times as long as the pedicels; sepals minute; corolla violet-pink, 22–25 mm long, broad; limb of outer petals broad, with a large apical notch; lower limb a broad inconspicuous tubercle; spur thick, as long as petals, slightly reflexed distally, obtuse; capsules pendulous, oblong, 10–12 cm long, 4–5 mm broad, acute, with thick walls, ripe capsules torulose owing to presence of seeds; stigma disk-shaped, slightly barbate crenate; seeds black, glossy, slightly punctate, large, ca. 3 mm in diameter; caruncle extending over a third of its circumference, band-shaped, scarious, appressed to seed. April–May. (Plate XLIII, Figure 10).

Shady forests, rarely among shrubs. — European part: U. Dnp., M. Dnp., Bl., U. V., V. -Don; Caucasus: Tal. (between the village of Bilazar and Ulyasay Mountain). Gen. distr.: Centr. Eur., Bal. -As. Min., Atl., Eur., Scandinavia. Described from Europe. Type in London.

12. *C. marschalliana* (Pall.) Pers., Syn. II (1807) 269; Ldb., Fl. Ross I, 98; Boiss., Fl. Or. I, 128; Shmal'g., Fl. I, 40; N. Busch in Fl. cauc. crit. III, 4, 60. — *Fumaria marschalliana* Pall., Nov. Act. Petrop. X (1797) 315. — *Capnites marschalliana* Rupr., Fl. Cauc. (1869) 55. — 660 Ic.: Gartenflora XV, tab. 511. — Exs.: HFR No. 2002.

Perennial; tuber small, orbicular or irregular; stem 15–30 cm high, simple, erect, with 2 leaves in distal part; leaves short-petioled; blade broad, twice ternate; segments long-petioled (lateral segments spreading),

lobes very short-petioled or sessile, broad, the lateral lobes nearly always bipartite into distally wide and proximally narrow lobules similar in form to the median, usually entire, large, oblong-elongate, obtuse or acute, sometimes apically denticulate lobes. Raceme on long peduncle, rather loose, cylindrical; bracts entire, green, oblong or ovate, large, two to three times as long as the pedicels; sepals conspicuous, 0.7 mm long, scarious, dentate; corolla 22–25 mm long, yellow or — in the Caucasus — sometimes outer petals pink, the inner yellow, erect, broad; limb of outer petals broad, with large apical notch; lower petals with inconspicuous protuberance; spur erect or slightly reflexed at tip, rather broad, obtuse; capsules declinate or pendulous, 15–20 mm long, 4–3 mm broad, acute; style long; stigma as in *C. cava*; seeds black, glossy, large, ca. 3 mm across, very slightly punctate; caruncle appressed to seed, scarious, band-shaped. April – May. (Plate XLIII, Figure 9).

Forests and shrubs. — European part: V. -Don, U. V., M. Dnp., Bl., Crim., L. V.; Caucasus: Cisc., W. and E. Transc., Tal. Gen. distr.: Bal. -As. Min., Iran. Described from the Crimea. Type in Berlin.

13. *C. nudicaulis* Rgl. in A. H. P. VIII (1884) 695. — Ic.: Rgl., 1. c., tab. XV, f. b, c, d.

Perennial; tuber spherical, 7–20 mm in diameter, with pale brown envelope; stem simple, slender, subfiliform, 10–15 cm tall, with 2 leaves in the middle; leaves green, rather delicate, on rather long, slender petioles, lower leaves 3 times, the upper twice or 3 times ternate; segments on long, slender petioles, lobes also petioled or subsessile, lobules elongated, to 4 cm long, linear-lanceolate or lanceolate or oblong, quite entire, acute or subacute. Raceme sparse, loose, elongated; bracts herbaceous, entire, oblong or lanceolate, acute, 4–15 mm long; pedicels in flower filiform, pendulous, short, in fruit pedicels recurved, the lower longer than bracts, to 2 cm long; sepals minute, inconspicuous; corolla 17–20 mm long, pale violet; limb of outer petals dark, rather narrow, with inconspicuous mucro; lower petals without basal tubercle; spur rather slender, ascending, upright or distally reflexed, slightly longer than petals; capsules linear-lanceolate, 10–15 (–20) mm long, ca. 2 mm broad, with slender walls, acute; seeds black, very shiny, smooth; caruncle band-shaped, scarious, rather short. April – May.

Clayey slopes in snow or among rocks, benches. — Centr. Asia: Pam. -Al., (Darvaz, Baldzhuan, Kulyab, Gissar Range). Endemic. Described from Darvaz. Type in Leningrad.

Note. This species is isolated among the few species of section *Radix cava*. In a unique way, it provides all transitions to the only Turkestan species referred to section *Pes-gallinaceus*, namely *C. glaucescens* Rgl. The type is distinguished from *C. glaucescens* as follows: 1) the absence of squamiform leaves in lower part of stem, 2) simple stem, 3) ternate, not pinnate leaves, 4) elongated acute lobules, 5) narrow corolla limb, 6) generally smaller corolla, 7) narrower elongated capsules. In the immense stretch from Darvaz and Gissar (where the typical *C. nudicaulis* grows) to Trans-Ili Ala-Tau — the primary range of *C. glaucescens* Rgl. — from the intermediate forms, approximating *C. glaucescens* and *C. nudicaulis*, while in the west (Zeravshan, Turkestan Range) there is a greater preponderance of *C. nudicaulis* as opposed to

C. glaucescens, in the east (Fergana Range, Aleksandrovsk Range). Closer study of this phenomenon in conjunction with experimental cultivation would be of enormous theoretical interest.

Section 3. **PES-GALLINACEUS** Irmisch, l.c., 273.—Cauline leaves usually 2; tuber small, spherical, each year replaced by a new tuber formed internally from a primordium developing in the spring in the cambial layer of the old tuber and reaching full development by the end of the summer at the same time as the old tuber becomes reduced to a thin membranous covering; stem with one large squamiform leaf in lower part, in the axil of which a branchlet or leaflets may develop; adventitious roots develop only at proximal pole of tuber and from the tip of the young tuber, not from its sides; bracts entire or pectinate-incised distally.

1. Bracts entire. Corolla always colored by anthocyanin, rarely white (albino). Series *Fabaceae* M. Pop. 2.
- + Bracts cuneate, pectinate-incised distally. Corolla yellow or anthocyanin. Series *Solidae* M. Pop. 8.
2. Corolla 4 cm long. Altai, S. Kazakhstan 14. *C. schangini* (Pall.) B. Fedtsch.
- + Corolla 15–25 mm long 3.
3. Raceme small, very compact, capitate, drooping before anthesis. European part of the USSR 17. *C. intermedia* (L.) Merat.
- + Raceme more or less loose, not capitate, not drooping before anthesis 4.
- 662 4. Leaves 3, nearly 4 times ternate, thinly dissected into short linear lobules; segments of first and second order long-petioled. Lower Amur, Ussuri 25. *C. fumariifolia* Maxim.
- + Leaves twice or nearly 3 times ternate or dissected; segments of second order (lobes), sessile or subsessile 5.
5. Segments of second order (lobes) entire, elliptic or oval, rarely short pectinate-incised distally or nearly dissected into long linear lobules. Raceme rather compact. Far East 6.
- + Segments of second order deeply incised into oblong-linear lobules. Caucasus, Central Asia 7.
6. Corolla 15–17 mm, whitish or light pink. Capsules small, broad, oval, shorter than the recurved pedicels. Lobes always entire 18. *C. repens* Mandl. et Mühldorf.
- + Corolla 17–22 mm long, violet-pink or blue. Leaves usually with entire lobes, these rarely dissected into elongated lobules. Capsules linear 19. *C. ambigua* Cham. et Schlecht.
7. Leaves ternate, i.e., with 3 segments of the first order. Caucasus 16. *C. caucasica* DC.
- + Leaves pinnate, with 5 segments of the first order. Central Asia 15. *C. glaucescens* Rgl.
8. Corolla yellow 9.
- + Corolla violet-pink or bluish, occasionally white 11.

9. Corolla limb large, broad; petals with large apical notch. Bracts dentate distally. Plant rather large. Altai, S. Siberia, environs of Leningrad. 26. *C. bracteata* (Steph.) Pers.
- + Corolla limb small, narrow. Bracts deeply dissected distally. Lobules of leaves narrow. Small plant of the Caucasus 10.
10. Capsule short, broad. Raceme compact. Leaf lobules short. 25. *C. alexeenkoana* N. Busch.
- + Capsule narrow, elongated, to 25 mm, 2–3 mm broad. Raceme loose. Leaf lobules and bracts very narrow 24. *C. angustifolia* (M. B.) DC.
11. Capsules short, oblong. Plains in the European part and W. Siberia 22. *C. halleri* Willd.
- + Capsules linear, elongated 12.
12. Leaves 3, almost 4 times ternate, dissected into short linear lobules. Segments first and second order long-petioled. Lobules of bracts very narrow. Ussuri Territory 20. *C. fumariifolia* Maxim. var. *incisa* M. Pop.
- 663 + Leaves twice, nearly 3 times ternate; segments of second order sessile or subsessile 13.
13. Outer petals notched at apex, notch without mucro. Stem usually strongly branching. S. Ukraine, Crimea. 23. *C. paczoskii* Busch.
- + Outer petals notched at apex, notch with sharp mucro. Stem usually simple. Amur River basin 21. *C. remota* Fisch.

14. *C. schangini* (Pall) B. Fedtsch. in A. H. P. XXIII, 2 (1904) 372; N. Bush, Fl. Sib. i Dal'n. Vost. I, 56; Kryl., Fl. Zap. Sib. VI, 1244. — *Fumaria schangini* Pall. in Act. Petrop. VI (1779) 267. — *F. longiflora* Willd. Sp. pl. III, 2 (1800) 860. — *Corydalis longiflora* Pers., Syn. II (1807) 269; Ldb., Fl. Ross. I, 98. — Ic.: Pall., l. c., tab. 14, f. 1–3; Bush., l. c., 57. — Exs.: HFR, No. 2401.

Perennial; tuber spherical, medium sized, 1.5–3 cm across; stem 5–35 cm high, usually simple, rarely with one branchlet from axil of squamiform leaf; the latter borne very low on stem, elongated; leaves usually 2, glaucescent, rather stiff, petioles short, slender; blade twice, nearly 3 times ternate; segments long-petioled, lobes subsessile, palmately incised into elongated, linear, oblong or ovate, usually acute sometimes obtuse lobules. Racemes loose, long, bracts entire, oblong or lanceolate, minate; pedicels slender, elongated, longer — in fruit markedly longer — than bracts, to 20 mm long, declinate or pendulous; sepals inconspicuous; corolla violet, 30–40 mm long, inner petals dark at apex; limb of outer petals very narrow, acutish; lower petals with rudiment of spur at base. Spur of the upper petal almost one and a half times longer than petal, erect, gradually attenuate from broad base; capsules linear, 20 mm long, 2 mm broad, acute, with long slender style; stigma with elongated, pendulous basal horns, 4-toothed at apex; seeds black, very glossy, 1.7 mm long; caruncle spreading, scarious, band-shaped, long. April–May.

Slightly saline consolidated sands, clayey deserts and stony dry slopes of the lower mountain zone.—W. Siberia: Alt., Irt.; Centr. Asia: Ar.-Casp., T. Sh. (Kara-Tau), Balkh. Gen. distr.: Dzu.-Kash. Described from Altai. Type in Berlin.

Note. This species with its long corolla and unique ecology is the only member of the *Pes-gallinaceus* section. It most closely resembles *C. nudicaulis* Rgl. and its flowers are most similar to *S. severzovii*.

15. *C. glaucescens* Rgl. in Bull. Soc. Nat. Mosc. XLIII, I (1870) 253.—*C. kolpakowskiana* Rgl. in A.H.P. V (1877) 633.—Ic.: Gartenflora, tab. 948.

664 Perennial; tuber orbicular, rarely oblong, 1.0–2.5 cm grayish to brown; the leafless, branchless lower part of stem 1–10 cm long, terminating in a broad, scarious ovate, scalelike leaf, (similar to a sheath), remaining part of stem branching, with 1–3 spreading, usually tightly clustered branches; cauline leaves 2 or 3, thin, of delicate consistency; petioles long, slender; blades 3–7 cm long, ovate, with 2–3-pairs of segments; lower segments long-petioled, the upper on short subuliform petioles, ovate, pinnately dissected into broad, approximate, cuneate lobes that are palmately incised into oblong-linear, obtuse lobules; upper leaves reduced and simple; central raceme on slender peduncle overtopping the leaves; racemes reduced, lateral leaves united at ends of branches. Raceme few-flowered, rather loose, especially in fruit; bracts herbaceous, entire, lanceolate; acuminate pedicels filiform, shorter than bracts, fruiting pedicels longer than bracts, 10–20 mm long, declinate or pendulous; sepals inconspicuous; corolla 20–25 mm long, violet-red or pink; limb of outer petals broad, notched at apex; lower petals basally tuberculate; spur straight or slightly curved, ascending, slender, obtuse, slightly longer than the petals; capsules lanceolate-ellipsoid, gradually tapering into a style; capsule 15 mm long, ca. 3 mm broad, with delicate valves; stigma disklike, with small verrucose teeth; seeds 1.5–1.8 mm across, black, very glossy; caruncle long, one-third to one-half the circumference of the seeds, spreading, scarious. April.

Shrubs, woods, slopes, to 1,800 m.—Centr. Asia: T. Sh. (E.), Dzu-Tarb., Pam.-Al. (only in Greater Zeravshan, Kuli-Kalon!). Gen. distr.: Dzu.-Kash. Described from the source of the Almatinka.

Note. Small fragments of *C. kaschgarica* Rupr. are mixed with the type specimen of *C. glaucescens*; however, this should not prevent the choice of the best specimens there as *C. glaucescens* which was in fact later described by E. Regel as *C. kolpakowskiana*.

16. *C. caucasica* DC., Syst. II (1821) 119; Ldb., Fl. Ross. I, 99; Boiss., Fl. Or. I, 128; Busch. in Fl. cauc. crit. III, 4, 57.—*Capnites caucasica* Rupr., Fl. Cauc. (1869) 56.—*C. tenella* Ldb., in Bull. Acad. Pétersb. II (1837) 313; Fl. Ross. I, 101.—*C. alboviana* Steup in Sched.—Exs.: HFR, No. 753.

Perennial; tuber spherical, 0.8–1.5 cm across, light grayish; squamiform leaf large, ovate or oblong; stem simple or with one branch from axil of scale, slender, 10–20 cm high, erect or flexuous; leaves usually 2, long-petioled; blade delicate, glaucescent, twice ternate; segments long-petioled, broad, dissected into 3 subsessile or short-petioled lobes; lobes obovate, cleft into 2–3 oblong-cuneate lobules or strong-toothed; ends of lobes and

teeth acute or obtuse. Raceme with few (2–10) flowers, loose; bracts oblong or ovate, entire, acute, large; pedicels slender, shorter than bracts even in fruit, to 10 mm long; sepals 1.5–2 mm long, scarious, palmately cleft into subulate lobules. Corolla violet-pink, 20–25 mm long; outer petals with large, broad limb, strongly notched at apex, at base of lower petal a more or less conspicuous rudiment of a spur; inner petals yellow; spur of upper petal rather broad, erect or slightly bent distally, obtuse; capsules declinate or nearly pendulous, long, ca. 20 mm, 2.5–3 mm broad, with narrow valves, acuminate; stigma disklike, with small dentate lobes, hornless basally; seeds black, glossy, smooth, ca. 2 mm across; caruncle scarious, saccate, divergent. April–May. (Plate XLIII, Figure 8).

Forests and shrubs.—Caucasus: Cisc., W. Transc., Greater Caucasus, E. Transc. (rarely). **Gen. distr.:** Bal.-As. Min. Described from the Caucasus. Type in Geneva.

Note. The white-flowered form, var. *albiflora* DC., is common. The specimens with a larger and more compact corolla, larger primordium of spur on the lower petal, and broader capsules are referred to *C. alboviana* Steup. (Kuban, Krasnaya Polyana, Mingreliya).

17. *C. intermedia* (L.) Mérat, Nouv. Fl. d. env. Paris (1812) 272; Shmal'g., Fl. I, 41.—*Fumaria bulbosa* β *intermedia* L., Sp. pl. (1753) 699.—*F. intermedia* Ehrh., Beitr. VI (1791) 146.—*F. fabacea* Retz., Prodr. fl. Scand., ed. II (1795) 167.—*Corydalis fabacea* Pers., Syn. II (1807) 269; Ldb., Fl. Ross., I, 99.—Ic.: Rchb., Ic. Fl. Germ. III, tab. 7; Hegi, Illustr. Fl. Mitteleur. IV, f. 738 f-k.—Exs.: HFR, No. 403.

Perennial; tuber small, spherical, 8–15 mm across, light brown; stem low, slender, 8–15 cm high, simple, mostly with one branch from axil of squamiform ovate leaf; leaves 2, on long slender petioles, biternate; segments long-petioled, lobes short-petioled; lobes obovate-cuneate, cleft into oblong-linear, slightly cuneate, obtuse, large lobules; leaf delicate, glaucous; raceme short, compact, subcapitate, few-flowered, drooping before anthesis; bracts entire, large, obovate, obtuse or short-acuminate; pedicels slender, even in fruit twice to three times as long as the bracts; sepals minute, scarious, dentate; corolla small, ca. 15 mm long, violet-pink, limb of outer petals rather broad, with large apical notch; spur broad, erect, obtuse, slightly longer than petal; lower petal inconspicuously torulose; capsules erect or declinate, oblong, 10–15 mm long, 4–5 mm broad, tapering to a flat beak passing into a style; stigma disklike, finely verrucose-dentate, basally hornless; seeds black, glossy, 2–2.3 mm across, caruncle long, scarious, saccate, divergent. April–May.

Forests and shrubs.—European part: U.V., V.-Don, U. Dnp. **Gen. distr.:** Centr., Eur., Atl., Eur., Scand., Bal.-As. Min. Described from W. Europe.

18. *C. repens* Mandl. et Mühldorf in Bot. Közl. XIX (1921) 90; Kom. i Al., Opr. rast. Dal'nevostoch. kraya. I, 575.—Ic.: Kom., I.c., tab. 175.

Perennial; tuber spherical, 1.0–1.5 cm across; stem low, 8–15 cm high, its lower underground part, from tuber to squamiform leaf, slender, long, filiform; branch emerging from axil of squamiform leaf usually similar to stem; leaves 2; petioles long; blade broad, twice ternate, upper leaf

(rarely both leaves) triternate; segments long-petioled (lateral segments opposite); lobes short-petioled, usually large, oblong, obtuse or acute, entire, rarely pectinately cleft into oblong distal lobules. Racemes small, rather compact; bracts entire, lanceolate or oblong, small; pedicels capilliform, slightly longer than bracts, in fruit longer than the bracts, declinate or pendulous, to 15 mm long; sepals minute, subulate; corolla small, ca. 15 mm long, suberect, whitish; limb of outer petals bluish inside, with broad apical notch; lower petals without basal tubercle; spur erect, rather thick, obtuse, slightly longer than petal; inner petals dark at apex, with pale high keel along back; capsules oval, short, to 10 mm long, 4–5 mm broad, acute; style slender; stigma obovate-triangular, with finely verrucous teeth distally; seeds 1.8 mm across, glossy, reddish black, inconspicuously punctate; caruncle narrowly bandlike, scarious, spreading. April.

Forests. — Far East: Uss. (southern part). **Gen. distr.:** Jap. -Ch. (Manchuria). Described from Vladivostok district. Type in Budapest.

19. *C. ambigua* Cham. et Schlecht. in Linnaea I, (1826) 558; Ldb., Fl. Ross. I, 101; Bush in Fl. Sib. i Dal'n Vost., I, 63; Kom., Fl. Manchzh. II, 351; Fl. Kamch. II, 159. — Ic.: Busch l. c.; Samoku Dzusetzu, ed. 2, XIII, tab. 4.

669 Perennial; tuber small, spherical, 8–15 mm in diameter; squamiform leaf very remote from tuber, oblong, long; stem 10–25 cm high, simple or with one small branchlet; petioles slender, rather long; blade glaucescent, delicate, biternate; segments long-petioled, lobes sessile or short-petioled, simple, elongate-oblong or obovate, obtusish or cleft or strongly dentate distally, with 1–3 lobules or teeth; rarely lobes elongate, broadly linear. Raceme rather loose, few-flowered, on long peduncle; bracts entire, lanceolate or oblong, acute, slightly longer than pedicels; pedicels filiform, to 12 mm long, declinate; sepals inconspicuous, minute; corolla violet-blue, 16–20 mm long, broad or narrow; limb of outer petals broad, large, with large apical notch, lower petals with large obtuse gibbosity; spur thick, suberect, obtuse, as long as petals; capsules linear, 10–15 mm long, 2–3 mm broad, moniliform, acute, erect or declinate, not pendulous, the lower on filiform flower stalks, longer than bracts (up to 20 mm long); seeds ca. 1.5 mm across, glossy. May–June.

Shrubs, forests, sandy or stony soil, in the North also along shores of seas and rivers. — Far East: Kamch., Sakh., Okh., Uda, Uss. **Gen. distr.:** Bering, Jap. -Ch. (Japan, Manchuria). Described from Kamchatka. Type in Leningrad and Berlin.

Note. I accept this species as interpreted by Maximowicz since Bush's conception of the boundary between *C. ambigua* and *C. remota* proved to be unclear. *C. ambigua* (Kamchatka, Sakhalin, shores of the Sea of Okhotsk) is distinguished by broad, oblong leaf lobules and a larger more compact corolla, with a large gibbosity on the lower petal, and broader lip. In the Amur and Ussuri Regions, var. *amurensis* Maxim. occurs: leaf lobules smaller, narrower, linear-oblong and corolla thinner, blue, with narrower limb; lower petals without gibbosity; in addition to the typical form there are f. *lineariloba* Maxim. — lobes linear, 4–6 cm long, 2–4 mm broad — and f. *rotundiloba* Maxim. — lobes broad, pectinate-dentate distally. Var. *amurensis* is to a certain extent intermediate. According to Komarov, the flowers of *C. ambigua* are odorless and



PLATE XLIII. 1-*Corydalis popovii* Nevski; 2-*C. nevskii* M.Pop; 3-*C. persica* Cham. et Schlecht.; 4-*C. erdelli* Yucc. (in right lower corner); 5-*C. conorhiza* Ldb.; 6-*C. arctica* M.Pop; 7-*C. pauciflora* Pers.; 8-*C. caucasica* DC.; 9-*C. marschalliana* Pers., lateral segment of leaf; 10-*C. cava* (Mill.) Schweig et Korte, lateral segment of leaf.

those of *C. remota* fragrant. We note that the Far Eastern *Corydalis* section *Pes-gallinaceus* is a complex group, owing to its frequent hybridization, and can be analyzed only by detailed field studies.

20. *C. fumariifolia* Maxim., Prim. fl. Amur. (1859); Kom. i Al., Opr. rast. Dal'nevost. kraya. I, 575.—*C. remota* var. *fumariifolia* Kom., Fl. Manchzh. II, 351; Bush, Fl. Sib. i Dal'n. Vost. I, 59.—Ic.: Bush, l. c., 63; Matsumura, Ic. pl. Koisikav. IV, tab. 214.

670 Perennial; tuber small, spherical, squamiform leaf large; stem 10–25 cm high, simple or with branch in axil of squamiform leaf; leaves tri-, nearly quadraternate; segments and lobes with long, slender petioles, lobes subsessile, broadly obovate, cleft almost to base into lobules of second order, pinnately dissected into sections of third order. Raceme rather loosely-flowered; bracts entire, oblong (type) or deeply and thinly pectinate-incised (var. *incisa* M. Pop.); pedicels slender, slightly shorter or the lower slightly longer than bracts; sepals minute, inconspicuous; corolla ca. 20 mm long, pink-violet; limb of outer petals not very broad, not dentate, with notch at apex, without mucro; spur erect, thick, subsaccate, quite obtuse (type) or more slender (var. *incisa* M. Pop.); lower petal not torulose at base; capsules erect, linear or oblong-linear. April–May.

Forests and shrubs.—Far East: Uss., Uda. Gen. distr.: Jap.-Ch. (Manchuria). Described from the Amur Region (Kkhurti). Type in Leningrad.

Note. This species is distinguished from *C. remota* and *C. ambigua* var. *amurensis* by very strongly dissected leaves and, perhaps, by a very obtuse spur. Var. *incisa* represents an obvious transition to *C. remota*: it has incised bracts, a thinner spur than *C. remota*, and similar segments and capsules which are partly erect, partly declinate. In general, there are frequent transitional forms between all species of the section *Pes-gallinaceus* growing in the Ussuri and Amur regions as a result of ancient or recent hybridization.

21. *C. remota* Fisch. ex Maxim., Prim. fl. Amur. (1859) 37.—*C. remota* var. *genuina* N. Busch, Fl. Sib. i Dal'n. Vost. I (1913) 58 (the rest of the varieties are mixed up with *C. ambigua*); Kom. i Alis., Opr. rast. Dal'nevost. kraya. I, 575.—*C. turczaninovii* Bess. in Flora XXII (1834) 6, nom. nudum.—Ic.: Bush, l. c., 59.—Exs.: HFR. No. 2353.

Perennial; tuber spherical, small, deep or near soil surface; stem 10–25 cm high, erect, slender, unbranched or with 1 or 2 branches from axil of large squamiform leaf; leaves 2; sepals long; blades biternate; segments long-petioled; lobes sessile or very short-petioled, broadly cuneate, cleft into 2–3 linear or oblong, slightly cuneate lobules or just as strongly dentate; bracts abruptly cuneate, usually deeply pectinate-incised into narrow lobules, rarely dentate, but not entire. Raceme rather dense, many-flowered, rarely few-flowered in weak specimens; pedicels slender, rather long, usually slightly shorter than bracts, the lower sometimes slightly longer than bracts; sepals minute, inconspicuous; corolla ca. 20 mm long, suberect or slightly arcuate, narrow, violet-pink, sometimes bluish; limb of outer petals not very broad, dentate, with notch at apex and sharp mucro; lower petals almost without basal tubercle; spur erect or slightly incurved, barely longer than petal, obtuse; capsules linear, pendulous,

10–25 mm long, 2 mm broad, torulose from protruding seeds, appearing moniliform, the upper sometimes erect; seeds small, ca. 1.5 mm across, reddish black, glossy; caruncle scarious, saccate, spreading. April–May.

671 Forests, forest margins, clearings, and shrubs. — E. Siberia: Dau. Far East: Uda, Uss., Ze.-Bu. **Gen. distr.:** Jap.-Ch. (Manchuria). Described from Dauria. Type in Leningrad.

Note. A very critical species in its relation to *C. halleri* Willd. and *C. ambigua* Cham. et Schlecht. According to Maximowicz, it is distinguished from *C. halleri* by the following: leaves more glaucous, more compact, with very conspicuous veins; segments longer, longer-petioled; bracts with a rectilinear-cuneate, not orbicular base, their lobes more deeply incised, thinner, gradually attenuate; corolla narrower; lower petals without basal tubercle; limb confluent, not revolute; pedicels longer and thus raceme looser; seeds less rounded, half as big. Komarov and Korshinsky also report that a narrow, linear capsule, normal for all Transbaikalia and Amur plants is also characteristic for *C. remota*. However, *Corydalis* from the Yenisei area (Minusinsk, Kansk districts) has characteristics which are just intermediate between *C. halleri* and *C. remota*: capsules oblong, broad and short; tubercle on lower petal obsolete but visible; apical notch of outer petals with distinct prickles, as in *C. remota*. Maximowicz has classified it as *C. solida* Guad. (i.e., *C. halleri* Willd.), Busch—as *C. remota*. *C. remota* is distinguished from *C. ambigua* by incised, not entire bracts. However, as both forms often grow together and vary to the same degree, distinct differences which could be corroborated by differences in geography and ecology have not been found. Various authors provide different characteristics for their separation, such as absence or presence of a tubercle on lower petal, color of petals, odor or lack of odor of corolla, deep or shallow growing tuber, etc. All these characters are obviously not significant; preferably, the species should be distinguished by the entire or incised bracts. The variations of *C. remota* are similar to those of *C. ambigua*; this is especially clear in the case of var. *rotundiloba* Maxim. (= var. *pectinata* Kom.) with broad dentate lobes and var. *lineariloba* Maxim. with lobes 4–6 cm long and 3–4 mm broad.

Economic importance. A good early nectar plant.

22. *C. halleri* Willd., Enum. hort. Berol. II (1809) 740. — *Fumaria bulbosa* γ *solida* L., Sp. pl. (1753) 699. — *F. halleri* Willd., Prodr. fl. Berol. (1787) 229. — *F. solida* Ehrh., Beitr. VI (1791) 146; Sm., Fl. brit. II (1804) 748. — *Corydalis digitata* Pers., Syn. II (1807) 269. — *C. bulbosa* DC., Fl. France IV (1815) 637. — *C. solida* Sw., in Svensk Bot. VIII (1819), p. et tab. 531; Ldb., Fl. Ross. I, 100; Kryl., Fl. Zap. Sib. VI, 1245. — Ic.: Smith, Engl. Bot. tab. 1471; Swartz in Svensk. Bot. tab. 531. — Exs.: HFR No. 703.

672 Perennial; tuber small, 8–15 mm across, light brown; stem 8–20 cm high, simple or with one branchlet in axil of large, oblong squamiform leaf just above tuber; leaves usually 2, delicate, glaucous; sepals short; blade broad, bi-, nearly triternate; segments long-petioled, cleft to base or for one-fourth to one-half into linear-oblong, slightly cuneate, obtuse, rarely obovate (var. *latiloba*) lobules; sometimes lobes entire or with 2–4 obtuse apical teeth. Raceme rather firm, cylindrical; bracts cuneate-obovate, distally incised into linear lobes or dentate; pedicels filiform, the

lower nearly as long as the bracts, to 10 mm, the upper shorter; sepals minute, inconspicuous; corolla pinkish violet, 15–20 mm long, limb of outer petals rather broad, with broad edentulate apical notch; lower petals with conspicuous basal tubercle; spur suberect or often slightly arcuate, obtuse, as long as or slightly longer than petals; capsules pendulous or declinate, oblong, 10–12 mm long, 3–4 mm broad, tapering into a beak in turn passing gradually into a style; stigma disklike, finely verrucous-dentate; seeds black, glossy, not punctate, ca. 2 mm across; caruncle narrow, band-shaped, scarious, spreading, short. April–May.

Open forests, among shrubs. — European part: Kar. -Lap., Lad. -Ilm., Dv. -Pech., U. V., V. -Kama, U. Dnp., V. -Don, Transv., Bl., L. Don, L.V.; W. Siberia: U. Tob. (Tobol'sk, Nefedovo village, according to Krylov); Centr. Asia: Syr D. (Tashkent, apparently introduced). Gen. distr.: Scand., Centr. and Atl. Eur., Bal. -As. Min. Described from the environs of Berlin. Type in Berlin.

Note. The plant from the Yenisei district may be referred either to *C. halleri* or *C. remota*; I call it var. *subremota* M. Pop.; it has capsules like those of *C. solida* and a corolla as in *C. remota*. The Krasnoyarsk Territory, Minusinsk District, forest in the vicinity of Shuzhelskaya (Martyanov, No. 98); in the shady forest along the Ashpa River (Martyanov, No. 109). Kansk district, larch forest between the villages of Aginskoye and Ilbinskoe (Yu. Voronov, No. 247). The specimens from Krasnoyarsk have apparently been collected in the previously mentioned localities. There is yet another specimen from Nerchinsk (Herb. Ledebour *Corydalis*, No. 80), collected by Turczaninow, which should be referred to *C. halleri* Willd. The question of the Baikal *Corydalis* type *halleri* — *remota* requires further observation in the field and larger collections in order to obtain a clearer picture.

23. *C. paczoskii* N. Busch in Fl. cauc. crit. III, 4 (1905) 55. — *C. angustifolia* β . *ramosa* Paczoski in Zap. Novoross. Ob-va Estestv. XV, I (1890) 68. — *C. ramosa* B. Fedtsch. in Bull. Herb. Boiss., VII (1899) 806, non Wall. — *C. solida* β . *pauciflora* Paczoski in Zap. Kiev. Obshch. Estestv. X, 2 (1899) 421. — Ex.: HFR No. 1754.

673 Perennial; tuber spherical, 8–15 mm across, light brown; squamiform leaf membranous, large; stem flexuous, 10–20 cm tall, rarely nearly unbranched, with 1 or 2 branches from axil of squamiform leaf, branches divaricate; leaves 2 or 3, with slender petioles; blade slender, delicate, biternate; segments long-petioled, lobes sessile or subsessile, broadly cuneate, incised for one-fourth to one-half into oblong-linear, obtuse lobules. Raceme rarely loose, few-flowered; bracts herbaceous, cuneate, palmatisect for one-eighth (?) to one-fifth into linear lobes; pedicels pendulous, slender, fruiting pedicels shorter than bracts to 10 mm; sepals minute, inconspicuous; corolla violet-pink, slightly arcuate, 17–20 mm long; limb of outer petals rather broad, notched at apex; spur erect or slightly arcuately inflexed, rather slender, obtuse, almost as long as petals; capsules erect, spreading or (the lower) even pendulous, to 25 mm long, linear, ca. 3 mm broad, acute, tapering into a beak, terminating in a style; stigma disklike, verrucous-crenate; seeds black, glossy, ca. 2 mm across; caruncle spreading, band-shaped to saccate, long, scarious. April.

Shrubs and forests. — European part: Crim. (often), Bl. Endemic. Described from the Crimea. Type in Leningrad.

24. **C. angustifolia** (M. B.) DC., Syst. II (1821) 120; Ldb., Fl. Ross. I, 100; Boiss., F. Or. I, 130; Busch in Fl. cauc. crit. III, 4, 59. — *Fumaria angustifolia* M. B., Fl. taur.-cauc. II (1808) 146 et III, 458. — *Capnites angustifolia* Rupr., Fl. Cauc. (1869) 57. — Ic.: Gartenflora IX, tab. 304.

Perennial; tuber small, 7–15 mm across, spherical, light gray-brown; stem simple or with one branchlet in axil of squamiform leaf, slender, 10–15 (–20) cm high, with 2 leaves in upper part; leaves with rather long, slender petioles; blade broad, nearly triternate, segments long-petioled; lobes broadly obcuneate, short-petioled, cleft nearly to base into 2–3 linear or oblong-linear, elongated, obtuse or acute lobules. Raceme few-flowered, loose, but not long; bracts cuneate, incised to one-half or less or distally dentate, sometimes entire, oval, longer than pedicels; pedicels filiform, declinate, to 10 mm; sepals minute; corolla light yellow, rather large, 22–25 mm long; limb of outer petals not broad, notched at apex; lower petals with small, pointed basal tubercle; spur erect, rather slender, slightly ascending, obtuse, rarely distally recurved; capsules linear, elongated, to 25 mm long, 2–3 mm broad, declinate or pendulous, dapering into a beak, in turn passing into a style; stigma disklike, with finely verrucous-capitate margin. April–May.

Forests. — European part: Lad. -Ilm. (Leningrad, growing wild), Crim. (?); Caucasus: E., W. and S. Transc. **Gen. distr.:** Iran. Described from the Caucasus. Type in Leningrad.

674 Note. This species is distinguished from the rather closely related *C. caucasica*, by narrower, elongated leaf lobules, cuneate, incised bracts and the yellow corolla with narrower limb. It represents to some degree the transition from the series *Solidae* to the series *Fabaceae*.

25. **C. alexeenkoana** N. Busch in Fl. cauc. crit. III, 4 (1905) 56.

Perennial, distinguished from *C. angustifolia* DC., to which it is very closely related, by a shorter corolla (20–22 mm), thicker spur, and broader limb and, chiefly, by shorter, oblong, pendulous capsules. Presumably intermediate between *C. angustifolia* and *C. halleri* and, possibly an old hybrid between them. It rarely grows in the area of *C. angustifolia*. June.

Shrubs. — Caucasus: Dag. (near Makhachkala), E. Transc. (Tabitskhuri Lake; Zekar — the divide at the border of the Imeretia and Akhaltsikhe districts). Described from Dagestan. Type in Leningrad.

26. **C. bracteata** (Steph.) Pers., Syn. II (1807) 269; Ldb., Fl. Ross. I, 102; Busch, Fl. Sib. i Dal'n. Vost. I, 65; Kryl., Fl. Zap. Sib. I, 65; Kryl., Fl. Zap. Sib. VI, 1246. — *Fumaria bracteata* Steph. in Willd. Sp. pl. III (1800) 858. — Ic.: N. Busch, l. c., 67, colored plate 24; Bot. Mag. LX, tab. 3242. — Exs.: HFR No. 553.

Perennial; tuber spherical, small, 8–15 (up to 28) mm in diameter; stem simple, erect, 15–30 (–36) cm tall or with one branchlet from axil of leaf; the latter large, scarious, oblong; squamiform; leaves 2; petioles slender, long; blades glaucous-green, small, bi- nearly triternate; segments long-petioled; lobes short-petioled, broad, cuneate, cleft for one-third to two-thirds into slightly cuneate, oblong-linear or oblong-elongate, obtuse lobules. Raceme medium-compact; bracts cuneate, large, distally incised or dentate, sometimes elliptic, entire (var. *gracilis* Busch), longer than pedicels,

the latter filiform, divergent, 13 mm long; sepals minute; corolla yellow, arcuate, with ascending spur, usually 22–25 mm, sometimes to 40 mm long, limb of outer petals very broad, with large apical notch; lower petals with large, rounded tubercle; spur medium-thick to thick, ascending, erect or slightly reflexed distally, obtuse, slightly longer than petals; capsules pendulous or declinate, lanceolate, 15–20 (28) mm long, 3–4 mm broad, tapering into a beak; stigma disklike, finely verrucous-torulose at margin; seeds black, very glossy, 1.7–2 mm across; caruncle spreading, scarious, long, band-shaped. April–May.

Forests and shrubs.—W. Siberia: Ob (southwest), Alt.; E. Siberia: Yenisei, Ang.-Say, Dau.—Growing wild near Leningrad. **Gen. distr.:** Mong. Described from Altai. Type in Berlin.

675 Section 4. **DACTYLOTUBER** Rupr., Fl. Cauc. (1869) 54.—Rootstock tuberlike; tuber conical or cylindrical, proximally divided into 2–5 fleshy lobes which bear fibrous roots at their tips; stem in lower part with 1–2 small, squamiform, scarious leaves appressed to stem, not bent outward like *Pes gallinaceus*. Stigma low, broad, bicornute, with tooth confined to upper margin; capsules reflexed on erect pedicels. Small herbs with ternate leaves, usually with entire bracts and violet, rarely yellowish corolla. A very natural, morphologically isolated group.

- 1. Sepals large, 2–3 mm long, violet, fimbriate-ciliate. Corolla small.
Series *Calycinæ* m. 27. **C. conorhiza** Ldb.
- + Sepals 1–2 mm long, dentate. 2.
- 2. Stems branching, branches in axils of common leaves. Peduncles not longer than leaves. Flowers small, horizontal, 12–20 mm long.
Series *Alpestris* m. (*C. alpestris* s.l.) 3
- + Stems not branched or rarely few-branched. Peduncles markedly longer than leaves. Corolla often larger and vertically pendulous.
Series *Paucifloræ* m. (*C. pauciflora* s.l.) 4
- 3. Upper leaves usually remote from inflorescence closer base of stem peduncles long. Leaves less fleshy. Small blue points on bracts, sepals none or obsolete. Caucasus 28. **C. alpestris** C. A. M.
- + Upper leaves close to inflorescence, peduncle short. Leaves fleshier. Bracts and sepals bearing numerous small blue points. Very close to preceding species. Tarbagatai 29. **C. pseudoalpestris** M. Pop.
- 4. Corolla yellow, vertically pendulous, large, its lower leaves with large calcariform basal tubercle. Spur erect. Caucasus
. 32. **C. pallidiflora** (Rupr.) N. Busch.
- + Corolla blue-violet. 5.
- 5. Corolla vertically pendulous, small or large, without basal calcariform tubercle on lower petal. Spur erect. Stigma capitate, hornless
. 33. **C. arctica** M. Pop.
- + Corolla with distinctly visible basal calcariform tubercle on lower petal. Stigma with more or less distinct lateral horns 6.

6. Corolla large, vertically pendulous, with erect spur one and one-half times as long as the petals. Capsules glaucous. Caucasus 31. *C. emanueli* C. A. M.
 + Corolla large, often horizontal, with hamately recurved apical spur one-quarter longer than petals. Capsules not glaucous. 30. *C. pauciflora* Pers.

27. *C. conorhiza* Ldb., Fl. Ross. I (1842) 99; Boiss., Fl. Or. I, 131; Suppl. 26; Busch in Fl. cauc. crit. III, 4, 53. — *Capnites macrosepala* Rupr., Fl. Cauc. (1869) 61. — *C. ochroleuca* Rupr., l. c., (1869). — *Corydalis conorhiza* var. *macrosepala* et *ochroleuca* Boiss., Fl. Or. Suppl. (1888) 26. — *C. conorhiza* var. *Ruprechtii* N. Busch, l. c., (1913). — Exs.: HFR No. 802.

Perennial; tuber dark brown, shallow, small, conical, divided below (often indistinctly) into 2–5 short lobes; stem 5–10 cm high, with one squamiform leaf in lower part, simple erect; cauline leaves often 3, of which the middle leaf is the largest; the upper leaves sessile, reduced, sometimes absent; petioles of two lower leaves rather long, slightly broadened proximally into a vaginal sheath; lower leaf blades ovate or orbicular, pinnatisect, lateral segments often 2-pairs, the lower very remote; very rarely segments 3-pairs or one, if the latter case then leaves ternate, their segments short-petioled or subsessile, palmatisect almost to base into three lobes, incised in turn into 2–3 lobules or entire; lobules oblong or linear-oblong, rarely obtuse, often acuminate. Raceme compact, narrow, short, capitate, 3–8-flowered, barely overtopping leaves; bracts entire, rarely the lower tripartite, oblong, longer than pedicels, which are merely a few mm in length; sepals 2–3 mm long, ovate, scarious, deeply fimbriate; corolla 15–20 mm long, violet-pink, rarely yellowish (var. *ochroleuca* (Rupr.) Boiss.,) rather robust, suberect; lip of outer petals narrow, short, dark, obtuse; lower petals with large saccate basal tubercle; spur thickish, erect or slightly reflexed at apex, one and one-half times as long as the petals; capsules elliptic, 7–10–15 mm long, 4–5–6 mm broad. June–August. (Plate XLIII, Figure 5).

Alpine meadows, grass plots near snow patches at 2,100–3,150 m. — Caucasus: Greater Caucasus, W. and S. Transc. Gen. distr.: Bal.-As. Min. Described from Guria. Type in Leningrad.

28. *C. alpestris* C. A. M., Verzeichn. Pfl. Cauc. (1831) 176; Ldb., Fl. Ross. I, 98; N. Busch in Fl. cauc. crit. III, 4, 48. — *C. pauciflora* var. *alpestris* Akinf., Fl. Tsentr. Kavk. (1894) 55. — *C. nivalis* Boiss., et Huet in Boiss., Diagn., sér. 2, V (1859) 16. — *C. swanetica* Krasnov, Novyi vid, Svanet. flory (1891) 15. — *C. glareosa* Somm. et Lévl. in A. H. P. XIII (1893) 27. — *Capnites alpestris* Rupr., Fl. Cauc. (1869) 59. — Ic.: Somm. et Lev., l. c., tab. VI. — Exs.: HFR No. 953.

Perennial; tuber bi- or many-partite, with short or elongated lobes, in the latter case lobes cylindrical; lower, subterranean part of stem branched, 5–15 cm high; leaves 2 or 3, borne at base of underground part of stem, long-petioled, slightly scarious, broadened to a sheath beneath; leaflet with reduced blade or branchlet, often with raceme, frequently developing in the axils of leaves; lamina glaucous, small, ovate-rounded, ternate; segments approximate, subsessile or short-petioled, palmate-

677 incised nearly to base into 3 obovate lobes cleft into 2–3 oblong or oblong-linear or linear, often obtuse, rarely acute lobules or teeth; peduncle long scarcely overtopping the leaves or shorter than them, rarely the short-petioled leaf borne higher up. Raceme small, capitate, with 2–5, sometimes to 10, flowers, in the latter case the lower flowers remote, with long pedicels in axils of large bracts; bracts entire (the lower sometimes notched), ovate or oblong, longer than the pedicels or the lower as long as the pedicels, acute, 5–10 mm, rarely to 20 mm long; sepals small, ca. 1 mm broad, white, square or oblong margin short-toothed; corolla bluish, rarely pink-violet, very rarely whitish, sometimes with blue limb, 15–20 mm long, suberect, rather slender; limb of outer petals short, barely longer than inner petals, short-acuminate; lower petal with small basal tubercle; spur slender, suberect or slightly arcuate or hamately bent at apex, one and one-half times as long as the petal; capsules small (5–) 10–15 mm long, 5 mm broad, ellipsoid. June – August.

Stony slopes and taluses, rarely in grass plots of the alpine zone 2,400–3,000 m. – Caucasus: Greater Caucasus (often). **Gen. distr.:** Bal. –As. Min., Ind. –Him. Described from the Caucasus. Type in Leningrad.

Note. To this species are referred var. *calcarea* N. Busch (*C. calcarea* Albov., Prodr. fl. Colch. (1895) 17), large plants, to 20 cm tall, with large leaves (Abkhazia) and var. *bayerniana* (Rupr.) M. Pop. (*Capnites pallidiflora* β *bayerniana* Rupr., Fl. Cauc. (1869) 59), corolla pale yellow, inner petals with dark apical spot (Central Caucasus). Due to the presence of branches in axils of leaves and according to the characteristics of the corolla – small (15–18 mm) and horizontal, with a horizontal recurved spur – should certainly be included in *C. alpestris* and not, as Ruprecht and Busch assumed, in *C. pallidiflora*. The degree of branching of the stem, was first noted as characteristic of *C. alpestris* by Prain (Journ. As. Soc. Bengal. LXV, 2, p. 21).

29. *C. pseudoalpestris* M. Pop., sp. nova in Addenda VI, p. 579.

678 Perennial, 5–8 cm tall, measured from tuber; tuber cylindrical, 2–4 cm long, simple or proximally divided into a few lobes; stems in lower part creeping among stones, white, slender, with 2 squamiform leaves; cauline leaves often 3; petioles long, scarious below, expanding; blade glaucous, small, with 3 approached, almost sessile segments; segments dissected nearly to base into 2–3 broadly cuneate lobes, cleft to the middle of the oblong or oblong-linear lobules or only dentate at apex; in the axils of leaves are borne leaflets [sic!] or flower-bearing branchlets; raceme not overtopping leaves, usually below level of leaves, small, with 2–4 approached flowers or 1-flowered; bracts like leaves slightly fleshy, ovate or obovate, obtuse, small, bearing minute blue points; peduncles 2–3 mm long, nearly twice as long as the bracts; sepals 1 mm long, angular, barely dentate, white, with small blue points; corolla horizontal, ca. 17 mm long, whitish or slightly azure, limb of outer petals blue or violet, short, narrow, barely longer than inner petals, obtuse; lower petal with small spur-like, acute tubercle at base; spur rather slender, erect, horizontal, more or less reflexed at apex, obtuse, nearly twice as long as the petal; capsules small, ca. 10 mm long, 5 mm broad, oblong-oval, obtuse; style slender, 1.5 mm long; stigma small, subcapitate or with obtuse lateral horns. July – August.

Rock streams and rocks in the alpine zone. – Centr. Asia: Dzu-Tarb. (Tarbagatai: Mastaya, upper reaches of the Ulkun-Ulasta: V. Saposhnikov);

Saur, Taz Pass (Schischkin and Genina). Endemic. Described from Tarbagatai and Saur. Type in Leningrad.

30. *C. pauciflora* (Steph.) Pers., Syn. II (1807) 269; Ldb., Fl. Ross. I, 97 et 746; Bush, Fl. Sib. i Dal'n. Vost. I, 52—56 (excl. var. *sibirica* and *parviflora*); Kryl., Fl. Zap. Sib. VI, 1243; Kom., Fl. Kamch. II, 160.—*Fumaria pauciflora* Steph. in Willd Sp. pl. III (1800) 861.—*F. altaica* Ldb. in Mém. Ac. Pétersb. V (1815) 551.—*Corydalis altaica* Bess. in Flora XXII (1834) 5.—Ic.: Ldb., Ic. pl. Fl. Ross, tab. 450; Bush, l. c.

Perennial; tuber usually short-branched, conical, dark brown; stem branchless, with one raceme; 1 or 2 or often 3 scaly leaves on lower part of stem, directly above scale—rarely a small leaf in its axil; peduncles robust, one and one-half times as long as leaves; sepals long, scarious-vaginal below, blades small, with 3 approached, lateral, subsessile segments; segments parted nearly to base into obovate-cuneate obtuse lobes, these entire or cleft into 2—3 lobules or teeth; lobules linear-oblong. Raceme 3—10-flowered, short, dense, subcylindrical; bracts entire, small, obovate, oval or oblong, acute or obtuse; pedicels as long as or slightly longer or shorter than bracts; sepals rounded-angular, dentate, 1—2 mm across; corolla horizontal, rarely drooping, ca. 20 mm long, blue-violet; lip of outer petals broadly ovate, short-acute; lower petal with acute spur-like, basal tubercle. Spur obtuse, curved at apex. June—August. (Plate XLIII, Figure 7).

379 Moss-lichens or stony tundra in the alpine zone, moraines, and banks of mountain streams.—Arctic: Chuk., An.; W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau.; Far East: Kamch., Okh. Gen. distr.: Mong. Described from Altai. Type in Berlin.

Note. According to Turchaninow, in the Altai form the corolla is violet, and in the Baikal form blue.

31. *C. emanueli* C. A. M., Verzeichn. Pfl. Cauc. (1831) 176; Ldb., Fl. Ross. I, 98; Lipskii, Dop. Fl. Kavk. I, 34—38.—*Capnites emanueli* Rupr., Fl. Cauc. (1869) 58.—*Corydalis pauciflora* N. Busch in Fl. cauc. crit. III, 4, 50, non Pers.

Perennial; scaly leaves in lower part of stem 2; 2—4 leaves also in lower part of stem, shorter than the long peduncle; branchlets in axils of ordinary leaves; leaves long-petioled, scarious and slightly broadened basally, usually subtending branches; blade small, with 3 approached segments, very short-petioled; segments palmately dissected almost to base into 2—3 obovate or cuneate lobes, these in turn incised into 2—3 linear or oblong, acute or obtuse lobules or teeth; peduncles longer than leaves. Raceme broad, with 2—6 approached flowers; bracts small, entire, oblong, as long as or shorter than pedicels; sepals scarious, violet, ca. 1 mm long, orbicular or flabelliform, dentate; corolla 20—25 mm (N. Busch—to 35 mm) long, blue-violet, usually drooping, with aroma reminiscent of jasmin (Meier); limb of outer petals rather large, only slightly larger than inner petals, short-acute, blue; basal gibbosity of lower petal acute, small but distinct, spur long, twice as long as petal, rather stout, erect or slightly arcuate, obtuse, pointing forward; capsule small, oblong, acute, with glaucous bloom, 11—12 mm long, 3—4 mm broad, pendulous. August.

Alpine zone, 2,400–2,500 m. — Caucasus: Greater Caucasus (Kazbek, Chernye Gory, Teberda). Endemic. Described from Chernye Gory. Type in Leningrad.

32. *C. pallidiflora* (Rupr.) N. Busch in Fl. cauc. crit. III, 4 (1905) 52. — *C. pauciflora* var. *pallidiflora* Trautv. in A. H. P. V (1877) 404; Boiss., Fl. Or. Suppl. 25. — *C. emanueli* var. *pallidiflora* Lipskii, Fl. Kavk. (1899) 217. — *Capnites pallidiflora* Rupr., Fl. Cauc. (1869) 58. — Ic.: Rupr., l. c., tab. IV, F. 1. — Exs.: HFR No. 1753.

Perennial, representing a yellow-flowered variety of *C. emanueli*. Similar to *C. emanueli* in every aspect, but flowers sulphur-yellow, 20–30 mm, most often 25 mm long; stem often without branches in axils of leaves, rarely with them. Lobules of green and glaucescent leaves oblong, obtuse; tubercle at base of lower petal larger, petal limb broader. July.

680 Alpine meadows, 2,500–3,300 m. — Caucasus: Greater Caucasus (Tushetiya, Osetiya, particularly often Balkariya), Dag. Endemic. Described from Dagestan. Type in Leningrad.

33. *C. arctica* M. Pop. sp. nova in Addenda VI, p. 751. — *C. pauciflora* var. *sibirica* Rgl. in Bull. Soc. Nat. Mosc. XXXIV, III (1861) 135 (p.p.) et var. *parviflora* Rgl., l. c. 136 (p.p.); N. Bush, Fl. Sib. I Dal'n. Vost., I, 52–55. — Ic.: Bush, l. c., 54–55.

Perennial, distinguished from *C. pauciflora* by erect spur and total absence of basal tubercle of lower petal; the latter character also distinguishes it from *C. emanueli* — which it resembles in the erect spur. In all other characters it agrees with *C. emanueli*. The size of the plant varies from large, to 30 cm tall with corolla to 32 mm long (var. *sibirica* Rgl. et Til. m.), to the small plants, 5–10 cm tall with corolla 15–20 mm long (var. *parviflora* Rgl. m.). In var. *sibirica* the spur is sometimes slightly reflexed at apex. In var. *parviflora* the inflorescence is 1–3-flowered; leaves are small, often with simple or slightly incised segments; stem often slender; spur always erect. June–August. (Plate XLIII, Figure 6).

Blades and shores of seas and rivers. — Arctic: An., Chuk.; E. Siberia: Lena-Kol., between the Lena and Olenek rivers, near the Atyrkan stream, near the timberline (Chekanovskii). Inter Jacutiam et Ochotiam (Turczaninow). — both var. *sibirica* m. In Saraulakh mountains 2,500 m — (Tol., No. 85). At mouth of Lena: Angardam (A. Bunge). — both var. *parviflora*. — Far East: Okh.: Prope Ajan (Tiling). Shore of Ayan Bay (Derbek), Port Ayan (Kashkarov). — all three var. *sibirica*; Arctic: An. ad brachium fl. Anadyr (Maydell); Chuk.: on Emma inlet in Provideniya Bay, 64°45' N (Borisov). — both var. *sibirica*; Kamch., Karaga village, Kukushka Mountain (Novograblenov); Kamchatka River basin (Protopopov) — both var. *sibirica*. Gen. distr.: Bering. Described from Yakutia (mouth of the Artyrkan River). Type in Leningrad.

Section 5. CERATOTUBER M. Pop. — Tuber small, irregular at tip of creeping rootstock, cornute appendages renewed each year (?), producing roots over entire surface. Stem bearing several squamiform leaves in its lower part.

34. *C. buschii* Nakai in Bot. Mag. Tokyo XXVIII (1914) 329. — *C. decumbens* Maxim; in Sched.; Kom., Fl. Manchzh. II 345; Bush, Fl. Sib. i Dal'n. Vost. I, 39 (non Pers.). — Ic.: Bush. — Ic.: Bush., l. c., 40.

681 Perennial; stem usually one, upright, 10–25 cm high, with 2 squamiform, elongated leaves appressed to lower part of stem, bearing above or 3–4 ordinary leaves, often with branchlets in their axils; leaves with rather long, slender petioles, tri-, nearly quadraternate; segments long-petioled, lobes short-petioled, lobules subsessile, palmately-pinnately dissected into linear, acute lobules of the 2-order; leaves delicate, glaucous beneath, inconspicuously torulose-scabrous along veins and margins of petioles; upper leaves reduced, short-petioled. Raceme rather dense, compact, rarely loose; bracts obovate or oblong, truncate, obtuse or acute, always irregularly denticulate distally, equal to or somewhat shorter than filiform pedicels; sepals inconspicuous; corolla pink, 20–25 mm long, suberect; limb of outer petals small, orbicular, with small apical notch; lower petals without basal tubercle; spur firm, erect, obtuse, barely as long as petal; capsules declinate and upright, not pendulous, somewhat reniform, linear, elongated, sometimes bent, 20–25 mm long, 1.5–2 mm broad; stigma very low, broad, arcuate, 2-horned, with 2 terminal teeth; seeds black, glossy, punctulate, 5 mm across. April–May.

Wet meadows, most forest glades, sometimes forest hollows. — Far East: Uss. (southern part). Gen. distr.: Jap. -Ch. (Manchuria, Korea). Type in Leningrad.

Note. Maximowicz, Komarov, and Bush consider the present species to be synonymous with *C. decumbens* Pers. Yet, it is distinguished from the latter by a large number of characters, even at the section level: *C. decumbens*, growing in Japan, lacks squamiform leaves; the tuber is spherical, without a creeping rootstock; radical leaves present; leaves 2 on stem; leaf lobules shorter, broader and more obtuse; bracts entire; raceme very loose, pedicels longer than bracts, very slender; limb of petals broad, with large notch.

In setting up the new section, I was unable to determine the real structure of the tuberiform root system of *C. buschii*, which is very unique, and rather reminiscent of the root system of some American species of *Dicentra* than the European-Asiatic species of *Corydalis*.

Subgenus 2. **CAPNOIDES** DC., Syst. II (1821) 122. — Root not tuberous; annual or biennial or perennial, elongated, branching. Cotyledons 2. Leaves often pinnate, rarely (*Microcapnos*) ternate.

Section 1. **ARCHAEOCAPNOS** M. Pop — Perennials. Rootstock cylindrical, sometimes inflated-thickened, covered with numerous scales providing abundant, thin, adventitious roots. Radical leaf one, large, broad, with large broad lobules; corolla red or violet; stigma very unique, shaped like an elongated rectangle, with verrucose protuberances at the angles and a larger, simple or bifid apical protuberance; capsules pendulous, on erect pedicels.

1. Spur in bud curved upward. Sepals caducous, at early stage of bud growth. Leaf lobules narrower, gradually acuminate 2.
- + Spur, even in very young flowers not curved upward, erect. Sepals retained until flowering. Leaf lobules shorter, broader, obtuse . . . 3.
2. Corolla 25 mm long. Inflorescence strongly branching, paniculate. Plant up to 120 cm tall 36. *C. gigantea* Trautv. et Mey.
- + Corolla 30–40 mm long. Inflorescence with one terminal raceme and one lateral branch. Plant to 80 cm high 35. *C. macrantha* (Rgl.) M. Pop.
3. Inflorescence slightly branching, 1–3-branched. Terminal raceme loose. Peduncles slender 38. *C. paeoniifolia* (Steph.) Pers.
- + Inflorescence not branching, of one terminal, simple, dense raceme on a short and firm peduncle. 37. *C. redowskii* Fedde.

35. *C. macrantha* (Rgl.) m. Pop. sp. nova in Addenda VI, p. 580. —
C. gigantea var. *macrantha* Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 150.

Perennial; rootstock elongated, distally, thickened; stem hollow, finger-thick, brownish, glossy, upright, 60–80 cm high, branching above; cauline leaves 2 or 3, delicate, scarious, with rather short petioles, very large, the upper reduced, sessile; blade bi-, nearly tripinnatisect, its axis dichotomously branching, zigzag-like, lateral segments alternate on petioles, simple or tripinnatipartite, with alternate lobes deeply cleft into 2–3 very large, oblong or lanceolate, asymmetrical lobules, up to 7 cm long, 3 cm broad, entire or cleft, glaucous beneath, dark green above. From axil of upper leaf grows a branch terminating in a reduced raceme; terminal raceme simple, cylindrical, dense, 5–10 cm long, on a rather short, robust peduncle, barely overtopping the leaves; bracts narrow, elongated, entire, the lower shaped like an elongated narrowly-spatulate leaf, 3 cm long, the upper filiform-linear, gradually becoming reduced distally, slightly longer or shorter than peduncles; peduncles 3–6 mm long, upright, large, sepals soon caducous (at early stage of development of the bud), large, 5–9 mm long, suborbicular, entire, herbaceous-scarious; corolla 35–45 mm long, pendulous, slightly arcuate, dirty red; limb of outer petals small, ovate, acute; lower petal convex in lower part but without basal spurlike tubercle; spur slightly arcuately ascending, else erect, firm, gradually tapering, twice as long as the corolla. June–August. (Plate XLIV, Figure 7).

River valleys, forests and streams. — Far East: Ze. -Bu., Uss. Endemic. Described from Bureya Range. Type in Leningrad.

- 683 36. *C. gigantea* Trautv. et Mey. in Minnendorf. Reise nach Sibirien, B.I, Th. 2, Lief. 3 (1856) 13. — *C. gigantea* var. *genuina* et *amurensis* Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 149; N. Bush, Fl. Sib. i Dal'n. Vost. I, 35. — Ic.: N. Bush, l.c., 36; Miyabe et Miyake, Fl. Saghalin (1915) tab. 2.

Similar to *C. macrantha* in all characters, but rootstock more thickened above, tuberlike, stem taller, to 120 cm; inflorescence paniculate, very strongly branching, branching terminal raceme with several lateral racemes at base; entire inflorescence 10–20 cm long; corolla small, 15–25 mm long; sepals 2–4 mm, membranous, dentate; capsule small, 8–10 mm long, ca. 3 mm broad, oblong, broadening towards apex, obtuse. June–July.

Forests. Dense coniferous forests, along streams and brooks (Kom., Fl. Manchzh. II, 343). — Far East: Sakh., Uda, Uss. Endemic. Described from Mamga Bay. Type in Leningrad.

Note. The Sakhalin form is very uniform. It is distinguished by its strongly branching inflorescence and its very numerous and small flowers, ca. 17–18 mm long. A similar form occurs on the continent to which belong, for example, authentic specimens of *C. gigantea*: Udscoi Sib. orient. Exp. Acad. 1844, Guba Mamga, 25 Jul. 44 Kokkaido. In addition: Tyrma River at 14th rapids (Dokturovskii 487!). Khabarovsk District. Valleys at right tributary of the Elbin River (I. Kuznetsov 1851). Vicinity of Nikolayevsk-on-Amur (Detyaev). Amgun River basin, Ili River (I. Kuznetsov No. 346!). The authors of the species and Regel (l.c.) inaccurately record "bracteae pedicellis triplo longiores," for the bracts are only slightly longer than the pedicel or even shorter, so that this character fails to separate var. *genuina* and Var. *amurensis* Regel. The specimens collected by Maximowicz, for example "circa Alexandrowskoi," are in no way distinguished from the authentic specimens, but there are many specimens from Ussuri and Amur which are intermediate between *C. gigantea* and *C. macrantha*, particularly in their corolla, which is over 20 mm long but shorter than in *C. macrantha*, and also in their few-branched panicle; such specimens: Ussuri-Becken, Wai Fudin (Maximowicz). Ad Ussuri super. 15–27 Mai 1860 (Maximowicz), Suchan (Vasilev), Sedanka (Kozlov, No. 420), Tyrma River basin (Dokturovskii, No. 1937). I accept these as var. *amurensis* Rgl. Thus the conception of var. *amurensis* will vary slightly as compared with the Regel specimen, but even so, it is partly based on specimens cited by Regel, notably those of Maximowicz mentioned above.

37. *C. redowskii* Fedde in Repert. sp. nov. (1912) 508. — *C. redowskii* var. *Tilingii* Fedde, l.c. — *C. paeoniifolia* Bush, Fl. Sib. i Dal'n. Vost. I, 37 (p.p.).

684 Perennial, low plant, 25–40 cm high; stem upright, almost not branching, with 2 or 3 leaves, yellowish, glossy; lower cauline leaf borne on middle of stem, short-petioled, the upper strongly reduced and simple, sessile; lower cauline leaf large, broad, bipinnatisect; segments large, alternate, petioled, pinnately dissected into short, broad lobes, these either entire or divided into 2–3 lobules of which the middle is larger; lobes and lobules — if present — entire, asymmetrical, ovate, obtuse, 1.5–3 cm long, glaucous beneath, green above; upper cauline leave usually ternate, with entire ovate segments. Raceme simple, on a stoutish peduncle, dense, cylindrical or slightly conical, 3–6 cm long more or less overtopping the leaves; bracts entire, herbaceous, rather large, acute, the lower ovate, the upper oblong or lanceolate, with violet tips; sepals small, 1–2 mm broad, scarious, angular-rounded, dentate; corolla pink-violet, 22–25 mm long; limb of outer petals broad, ovate, obtuse, markedly longer than inner petals; lower petal convex-gibbose proximally; spur stout, more or less arcuately reflexed, obtuse, as long as or shorter than petals; peduncle somewhat shorter than bracts, upright; capsule pendulous, short, broad; style slender, long; stigma rectangular, with stigmatic verrucae at corners, and distal protuberance on upper side. May–July.

Shady, moist or swamp forests, and forest streams.—E. Siberia: Lena-Kol., Dau.; Far East: Ze.-Bu., Uda, Uss., Okh. Endemic. Described from the vicinity of Okhotsk (not from Kamchatka, as Fedde maintains). Type in Berlin and Leningrad.

Note. N. A. Bush does not separate this species from *C. paeoniifolia* Pers., to which it is in fact very closely related. Those characters by which Fedde distinguishes his species from *C. paeoniifolia*, in particular, the smaller (ca. 15 mm) flowers and larger pectinate outer petals, appear to be immaterial and fortuitous. In my opinion, the features distinguishing *C. redowskii*, from *C. paeoniifolia*, are: 1) simple dense racemes, broader bracts, spurs in the mature flowers more reflexed and not more erect than in *C. paeoniifolia*, as stated by Fedde. Thus conceived, *C. redowski* is quite distinct from *C. gigantea* and *C. macrantha*.

38. *C. paeoniifolia* (Steph.) Pers., Syn. II (1807) 269; Ldb., Fl. Ross. I, 102; Bush, Fl. Sib. i Dal'n. Vost. I, 37 (p.p.).—*Fumaria paeoniaefolia* Steph. in Willd., Sp. pl. III, 2 (1800) 859.—*Fr.*: Gmel., Fl. Sib. II, tab. 34.

Perennial, somewhat taller than *C. redowskii*, 30–60 cm high; leaf lobes and lobules slightly narrower than *C. redowskii*, short-acuminate; raceme branching, with 2 or 3 branches; peduncles long, slender; terminal raceme loose; bracts oblong or lanceolate, elongated; spur suberect; limbs of outer petals narrower, distinctly acute.

685 E. Siberia: Lena-Kol. (system of the Lena River, Tarynurie, Khandyga tributary, Rysi village, Gilyui River basin), Dau. (Argun); Far East: Ze.-Bur. (source of the Alemutnochi River). Described from the Lena River. Type in Berlin.

Note. The real *C. paeoniifolia*, described by Stephan as *Fumaria paeoniaefolia*, has the characters described above, i.e., characters intermediate between *C. redowskii* and *C. gigantea*. In general it can be distinguished from *C. gigantea* and var. *amurensis* only by its upwardly curved spur, the flower bud, and the bracts. The gap between *C. redowskii* and *C. paeoniifolia* is filled by transitional forms between these very close species. Such transitions are especially frequent in Amur, for example at the divide between Shilka and Chernyi Uryum, the Zeya River basin, and the Unakhe River basin.—All considered, the entire section *Archaeocapnos* forms an intricate complex which requires more careful study. *C. scouleri* Hook, closely allied to *C. gigantea*, grows in North America.

Section 7. *CALOCAPNOS* Spach, Veget. phan. VII (1839) 72–73 (as a genus)—*Capnogorium* Bernh. Ind. Sem. horti Erfurt. (1841); Endlicher Gen. suppl. 107.—Perennials, root cylindrical, branching, fibrous; radical leaves few, pinnate; corolla yellow; stigma various, fruit a dehiscent capsule. Very heterogeneous group, which requires furthestmost division, the type of which is *C. nobilis* Pers.

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- 1. Seeds without caruncle. Radical leaves few. Shade plant of forests, 30—60 cm high, with large, broad, bipinnatisect leaves. Segments 3—7-pairs, large. Series Umbrosae m 39. *S. semenovii* Rgl. et Schmalh.
- + Seeds with caruncle. Plant of open habitats, often xerophilous 2.
- 2. Spur slightly shorter than or as long as petals, 8—10-(—12) mm long 3.
- + Spur short, saccate, 2—6 mm long, distinctly shorter than petals. Lower part of petioles usually preserved from preceding year. Xerophilous plants of rocks and stony slopes 5.
- 3. Blade of radical leaves large, 15—20 cm long, 10—15 cm broad; bracts, at least the lower, dissected, leaf-shaped, larger, plants 60 cm high. Altai, Tarbagatai 40. *C. nobilis* (L.) Pers.
- + Blades of radical leaves much smaller. Plants smaller, 40 cm high, thinner. From Dzungarian Ala-Tau to the Pamir-Alai 4.
- 4. Petals without fimbriate margin. Petioles soft, not preserved. Bracts herbaceous, the lower pinnatisect. Alpine or subalpine plant. Series Moorcroftianae m. 41. *C. gortschakovii* Schrenk.
- + Petals with long-fimbriate margins. Petioles rigid, preserved. Bracts linear-filiform, nearly scarious, ciliate 42. *C. fimbrillifera* Korsch.
- 5. Stems leafless, not longer than radical leaves. Capsules broad, oblong, 5 mm broad. Caruncle spongy, mushroom-shaped. Sepals very large, up to 12 mm long. Series Rupestres m. (*C. rupestris* Boiss. et Ky. sl.l.) 51. *C. macrocalyx* Litw.
- + Stems leafy, cauline leaves generally longer than radical leaves. Capsules linear, ca. 2—3 mm broad. Caruncle smooth, hat-shaped (corymbiform). Series Strictae m. (*C. stricta* Steph., sl.l.)... 6.
- 6. Xerophilous rock plants, often with remains of previous year's petioles. Stems rounded, scarcely sulcate 9.
- + High-mountain plants without remains of previous year's petioles. Stems acute-angled and sulcate 7.
- 7. Stems taller, with numerous leaves, 40 cm high. Capsules broader, 3—4 mm broad. Bracts linear 7.
- + Stems 10—15 cm tall, with 1 or 2 small leaves. Capsules only 2 mm broad, linear; bracts ovate 44. *C. transalaica* M. Pop.
- 8. Stems unbranched or slightly branched. Leaf segments subsessile 43. *C. stricta* Steph.
- + Stems strongly branching. Leaves broad; segments long-petioled, lobes separate 50. *C. pseudostricta* M. Pop.
- 9. Inflorescence paniculate. Racemes elongated. Pedicels slender, long, 5—20 mm; sepals minute 47. *C. paniculigera* Rgl. et Schmalh.
- + Inflorescence often branching below but not paniculate. Pedicels short, up to 5 mm 10.
- 10. Leaves 2—3-sect. Sepals minute, ca. 1 mm long. Racemes dense. Pedicels abruptly divergent, to 5 mm. Corolla smaller, ca. 15 mm. 49. *C. pseudoadunca* M. Pop.

- + Leaves fleshy, stout, simply dissected into broad lobate segments or twice dissected but then raceme loose 11.
- 11. Raceme reduced, contracted. Sepals ca. 3 mm long. Bracts short-ovate. Low plants, 10–20 cm high 48. *C. kaschgarica* Rupr.
- + Raceme elongated, with remote flowers. Sepals 1–2 mm long 12.
- 12. Stems 15–25 cm high. Bracts ovate, short; lower bracts or all bracts herbaceous 46. *C. schelesnowiana* Rgl. et Schmalh.
- + Stems up to 50 cm tall. Bracts lanceolate 45. *C. bucharica* M. Pop.

687 39. *C. semenovii* Rgl. in Bull. Soc. Nat. Mosc. XXXVII, 1 (1863) 407. — Ic.: Rgl., l. c., tab. I, fig. 6–10.

Perennial; stems upright, 30–60 cm tall, rather stout, rounded-angled, with small slender branchlets in axils of leaves, leaves abundant; cauline leaves of the shade type, large, the lower ones with flattish, winged petioles, 5 cm long, the upper cauline subsessile; blades very large, 15–25 (–35 ?) cm long in lower leaves, broadly triangular-ovate in outline, pinnatisect, with 7–15 segments (3–7 pairs); segments alternate, elongated, on slender conspicuous petioles (1 cm long), pinnately dissected into alternate, strong (1–2 cm long) sessile or short-petioled, oblique, broadly ovate, ovate or oblong, large-toothed lobes; teeth or lobes obtuse, with an awnlike mucro or acuminate; midrib of segments and leaves thin; lobes thin, sometimes scarious. Raceme simple, cylindrical-capitate, 3–5 cm long, with short basal branches, compact, flowers approached, pedicels short, 3–4 mm, recurved; bracts linear, elongated, longer than pedicels, scarious, sometimes denticulate; sepals ovate-oblong, scarious, 2.3 mm long, denticulate, acute; corolla white, ca. 15 mm long, outer petals with narrow limb, obscurely crenate-dentate distally, with short mucro; spur short, ca. 2 mm long, obtuse; capsules pendulous or spreading, linear, 15–20 mm long, 2–3 mm broad, flat, with slender valves, and thin, with long attenuate flat beak, inconspicuously passing into a style; stigma tiny, 2-lobed; seeds black, glossy, faintly punctate, without caruncle. July.

Spruce forests, 1,500–3,000 m. — Centr. Asia: Dzu.-Tarb. (Dzhungarian Ala-Tau, southern part, along the Ili River), T. Sh. (often). **Gen. distr.:** Dzu.-Kash. (T. Sh.). Described from Trans-Ili Ala-Tau (Kurmekty Pass, 1,500 m, Semenov). Type in Leningrad.

Note. In habit somewhat resembling *C. nobilis* Pers. but leaf lobes broader; spur short, and seed without caruncle. Since the root system and radical leaves are unknown and the stigma is very unique, the position of this species remains very vague. It probably represents an independent section.

40. *C. nobilis* (L.) Pers., Syn. II (1807) 268; Ldb., Fl. Ross. I, 102; Bush, Fl. Sib. i Dal'n. Vost. I, 68; Kryl., Fl. Zap. Sib. VI, 1247. — *Fumaria nobilis* L., Syst. Nat., ed. XII (1767) 469. — *Calocapnos nobilis* Spach, Végét. phan. VII (1839) 73. — Ic.: Jacq., Hort. Vind. tab. 116; Sims, Bot. Mag. tab. 1953.

Perennial; rootstock stout, long, branching; root crown covered with scales, rudimentary leaves and corolla of decayed radical leaves; radical leaves large, long-petioled, almost as long as stem; oetioles thick, soft, sulcate like the stem, longer than the blades; blades short, broad, 15–20 cm long, 10–15 cm broad, tripinnatisect; segments elongated, long-petioled, with separate lobes; lobes short-petioled, alternate, ovate or flabelliform, cuneate, biternately dissected into oblong-linear or oblong obtuse, rarely acute, lobules; blade delicate, scarious or rigid; stems upright, soft, 60 cm high, without squamiform leaves below, leafy in upper half; cauline leaves short-petioled, similar to the radical but smaller; bracts similar to upper leaves, lower bracts cuneate, dissected, the upper scarious, entire or dentate, rarely all incised-dentate (var. *odontophylla* DC. Syst. II (1821) 122). Raceme short, compact, subcapitate when young; pedicels slender, fruiting pedicels 6–17 mm long; sepals ovate, dentate, ca. 2 mm long; corolla 20–22 mm long, yellow, with orange-yellow limb, inner petals dark violet at apex; spur erect, slightly inflexed distally, obtuse, ca. 10 mm long; capsules oblong or elliptic, 10–20 mm long, 5–7 mm broad, on horizontal or drooping pedicels; style 3–6 mm long; seeds black, glossy, ca. 2 mm across; caruncle scarious, narrow, extending over about half the circumference of the seed. April–May.

Shrubs, rocks, stony slopes, and shady ravines. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb. (Tarbagatai, Saur). Endemic. Described from Altai. Type in London.

41. **C. gortschakovii** Schrenk, Enum. pl. nov. I (1841) 100; Ldb., Fl. Ross. I, 746. — Ic.: Gartenflora XXXIV, tab. 1183.

Perennial; underground rootstock branching, with rather slender branches; stem base encircled by short scarious gray-brown scales, without persistent petioles; stems simple, rather stout, 5–40 cm high, delicately sulcate; radical leaves with rather stout petioles, usually somewhat shorter than the blades; blade oblong, bi-, nearly tripinnatisect, rather soft, green or glaucescent; 4–5 pairs of segments short-petioled, rather approached, ovate, pinnatisect into approached, obovate, pinnately incised or dentate lobes; lobules linear-oblong or oblong, acute or obtuse; cauline leaves 1 or 2, similar to the radical, with shorter petioles. Raceme simple, rarely (in very strong specimens) branching, rather compact, spicate-cylindrical with numerous approximate flowers when young; bracts herbaceous, pinnatisect, large, with linear segments, the upper entire, elongate-linear, all segments longer than pedicels; pedicels slender, rather long, pendulous or arcuate, up to 20 mm; sepals small, less than 1 mm across, scarious, dentate; corolla orange-yellow, 20–25 mm long, broad; outer petals with broad limb scarcely notched at apex; lower petal with large, saccate basal extension; spur broad, obtuse, erect or slightly inflexed, as long as petals; capsules pendulous, oblong, 10–15 mm broad, acute; style slender, long; stigma entire, disklike with 2 caudate appendages below. July–September.

Alpine and subalpine meadows, glades, sometimes stony slopes near patches of melting snow, 2,100–3,600 m. — Centr. Asia: Dzu.-Tarb. (Dzhungarian Ala-Tau), T. Sh., Pam.-Al. Endemic. Described from Dzhungarian Ala-Tau. Type in Leningrad.

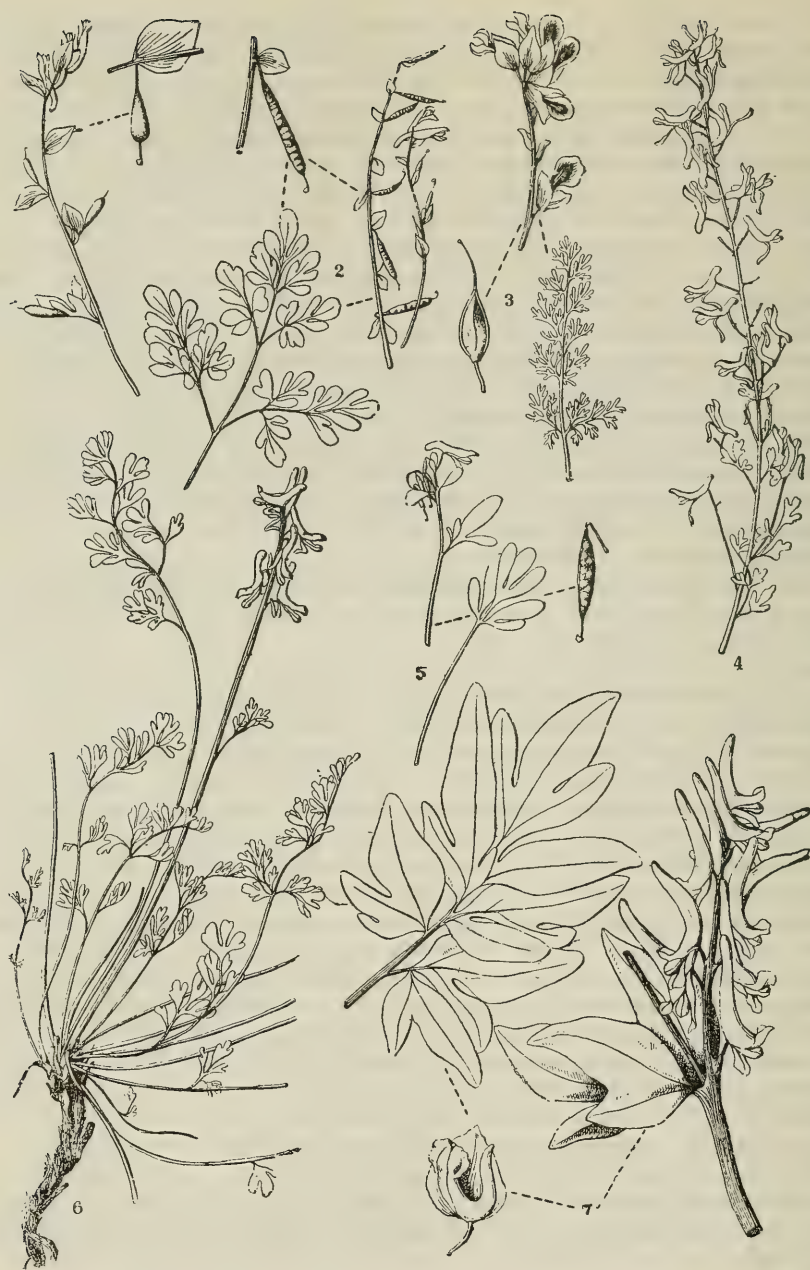


PLATE XLIV. 1. *Corydalis ochotensis* Turcz. (in left upper angle).— 2. *C. raddeana* Rgl.— 3. *C. macrocalyx* Litw.— 4. *C. paniculigera* Rgl. et Schmalh.— 5. *C. tenella* Kar. et Kir.— 6. *C. pseudoauncea* M. Pop.— 7. *C. macrantha* (Rgl.) M. Pop.

Note. The Himalayan species *C. moorcroftiana* Wall. and *C. govaniana* Wall. are very close to *C. gortschakovii*; according to Prain, the former is presumably identical with the Russian species. The plants from southern Tadzhikistan (upper reaches of the Zeravshan, Gornaya Bukhara, Pamirs) are distinguished from the Tien Shan plants (type) by: 1) scabrous bracts, 2) more crowded leaf lobes, 3) smaller corolla lacking the basal tubercle of the lower petal, and 4) frequently ovate sepals. However, I am not advocating their recognition as a separate species.

42. *C. fimbrillifera* Korsh. in Bull. Acad. Sc. Petersb. ser. V, XI (1898) 424.— Ic.: Korsh., l. c. tab. 1.

Perennial; root multicapital, forming tufts; crowns covered with remnants of erect petiole bases of the previous year; stems 20–30 cm high, slender, large, erect or slightly ascending, finely sulcate, not faceted, radical leaves one-half to one-third the length of the stem, with slender petioles; blade broad, ovate or oblong, bi-, nearly tripinnatisect; segments and lobes with slender petioles, segments 2–3 pairs, rather remote, lobes incised into 2–4 oblong, small, obtuse lobules; leaves glaucous, slightly fleshy. Raceme short, rather dense, capitate when young, branching below; lower branches in axils of reduced leaves, bracts linear-filiform, nearly scarious, as long as or slightly shorter than the pedicels, ciliate-margined; pedicels slender, filiform, 8–15 mm; sepals oblong, ciliate, produced into a filiform point, with point 5–6 mm long; corolla yellow, arcuate, narrow, 15–20 mm long; outer petals long-fimbriate, especially distally, produced into a ca. 2 mm long subulate point; spur slender, 8–9 mm long, almost as long as petal, abruptly recurved distally, obtuse; capsules divergent, apparently 20–25 mm long, 23 mm broad, slightly flexuous; style long. July–August.

Stony slopes and rocks.— Centr. Asia: Pam.-Al. (Shugnan, Shakh-Dare River, Bagu Pass, at the lower reaches of the Murghab River). Endemic. Described from the Shakh-Dare River in Shugnan. Type in Leningrad.

Note. Certainly belongs to the same group of xerophilous chasmophyte species of *Corydalis*, which includes *C. stricta*, *C. adunca*, *C. kaschgarica*, etc. Its leaves resemble those of *C. pseudo-uncum* m. and so do the racemes and the flowers, but the spur is longer and thinner, a character which is not encountered in any other species of the genus. In general, *C. fimbrillifera* represents in the group *C. stricta*, a similar and even more extreme anomaly, as *C. macrocalyx* does in the group *C. rupestris*.

43. *C. stricta* Steph. in DC., Syst. II (1821) 123; Ldb., Fl. Ross. I, 102; Bush, Fl. Sib. i Dal'n. Vost. I, 70; Kryl., Fl. Zap. Sib. VI, 1243.— Ic.: Ldb., Ic. Fl. Ross., tab. 56; Bush, l. c., 71.

Perennial; root thick, branching, multicapital, crowns covered with brown scales, remnants of decayed petioles; stems 20–40 cm high, slender or stout, faceted-sulcate, glaucescent or glaucous, few-branched, with rather abundant leaves; leaves glaucous, with rather narrow, oblong blade, tri-pinnatisect, the 4–5 pairs of segments remote (especially the lower); segments short-petioled or subsessile, pinnately dissected into ovate or obovate, sessile lobes in turn pinnately or palmately cleft into linear-oblong or oblong,

obtuse, small, fleshy lobules; petioles thick, large, sulcate, petioles of radical leaves as long as blade, in cauline leaves petioles shorter; cauline leaves well-developed, rather numerous, gradually becoming reduced acropetally. Raceme simple, crowded in strong specimens branching at base, 2–10 cm long; bracts narrow, long, usually linear, the lower slightly herbaceous, the upper scarious, sometimes dentate (in var. *potanini* Fedde — broader); pedicels short, 2–5 mm long, in fruit recurved, usually shorter than bracts; sepals scarious, oblong, dentate, acute, 3–4 mm long; corolla broad, yellow, ca. 17 mm long; outer petals undulate-dentate distally, dark (violet) at apex, with sharp mucro, 0.7–1.0 mm long; spur short, saccate, 2–3 mm long; capsules pendulous, oblong-linear, 15–20 mm long, ca. 3–4 mm broad, acute; styles 5 mm long; stigma triangular-bifid, with small lateral protuberances at lower corners; seeds black, very glossy, faintly punctate, 1.5–2 mm long; caruncle small, flat-hat-shaped, appressed to seed. May–July.

Stony slopes and clayey-solonetz places. — W. Siberia: Alt.; Centr. Asia: T. Sh., Pam.-Al. (Pamirs). **Gen. distr.:** Mong., Tib. Described from Altai. Type in Geneva.

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44. **C. transalaica** M. Pop. sp. nova in Addenda VI, p. 580.

Perennial low-growing plant, 10–15 cm high, apparently forming tufts; base of shoots covered with light brown scales; radical leaves 5–8 cm long, with rather stout, large, angular petioles; blade longer or shorter than petioles, ovate-oblong, nearly thrice dissected; segments 3–4 pairs, the lower much reduced, short-petioled, often dissected into small lobes cleft into oblong-linear congested, stoutish, glaucous lobules; cauline leaves 1 or 2, strongly reduced; stems robust, large, sulcate, simple or slightly branched. Racemes simple, dense, short, many-flowered; 3–4 cm long, bracts nearly scarious, oblong-ovate, rather short, dentate-fimbriate, filiform-mucronate; pedicels rather short, ca. 3 mm long, thick, abruptly recurved; sepals scarious, oblong-ovate, fimbriate, acute, ca. 3 mm long; corolla yellow, narrow, ca. 15 mm long; outer petals dentate, as if short-fringed, with hamately curved mucro, 1–1.5 mm long; spur short, saccate, obtuse, ca. 3 mm long; capsules linear, slightly flexuous, pendulous, 10–15 mm long, 2 mm broad, acute; styles slender, long; seeds 1.7 mm across, black, quite smooth, very glossy; caruncle tiny, flat-pileiform, firmly adjacent to seed. July.

Centr. Asia: Pam.-Al. (Trans-Alai Range, in the Muksu River valley below Altyn-Mazara, 2 VII 1904, B. A. Fedchenko). Endemic. Described from the Muksu River. Type in Leningrad.

Note. Very close to *C. stricta* Steph., from which it is distinguished by small growth, few-leafed stem, broader bracts, more dentate petals, and narrow capsules. Could it not represent its alpine form?

45. **C. bucharica** M. Pop., sp. nova in Addenda VI, p. 581.

Perennial; root robust, multicapital; crowns covered with brown scales and the decayed remnants of the previous year's petioles; stems to 50 cm high, upright, firm, orbicular, slightly thin-sulcate, strongly branching; radical leaves with long, slender petioles; blade broad, with strongly divergent, petioled segments; segments ovate, once or twice pinnatisect into rather broad, flabelliform or cuneately obovate, obtuse, often mucronate

lobules; cauline leaves short-petioled, with fewer, less dissected segments. Racemes branching, rarely simple, and then lower branches with 2 or 3 flowers; flowers ca. 5 mm long, slender, firm, upright; bracts lanceolate, entire, the lower glaucous, herbaceous, the upper scarious, sometimes slightly denticulate; sepals small, ca. 2 mm long, scarious, dentate, caudate-acuminate; corolla orange-yellow, narrow, 15–18 mm long; outer petals violet, entire, with small limb, short-mucronate; spur slender, arcuate or suberect, more robust, obtuse, 3–5 mm long; capsules oblong-linear, slightly flexuous when young, acute, upright or spreading, 10–15 (–25) mm long, 2–3 mm broad; stigma orbicular-triangular, bifid, without lateral protuberances at lower angles; seeds black, glossy, ca. 2 mm long; caruncle sessile, flat-hat-shaped, minute. May–July.

Red sand slopes in central mountain zone. — Centr. Asia: Pam.-Al. Endemic. Described from Bukhara. Type in Leningrad.

46. *C. schelesnowiana* Rgl. et Schmalh., Descrip. pl. nov. Fedtschenko lect. in Izv. Ob-va Lyub. Est., Antr. i Etn. XXXIV, 2 (1882) 4.

Perennial, forming small tufts; crowns with a few scales and remnants of petioles; stems robust, yellowish, 15–25 cm high; leaves fleshy, nearly pinnate, rarely pinnatisect; segments weakly lobed, obovate, with orbicular obtuse lobes or cleft into obtuse, cuneate lobules. Racemes elongated but dense, sometimes branching below; bracts short, ovate, the lower (sometimes all) herbaceous, the upper often scarious; pedicels very short, the lower 5 mm, the upper 1–3 mm; sepals minute, ca. 1 mm long; corolla narrow, curved, yellow; spur 4–6 mm long. Distinguished from *C. paniculigera* by broad leaf segments, narrow racemes with subsessile flowers, and ovate bracts. From *C. kaschgarica*, which has similar leaves, it is distinguished by elongated racemes and tiny sepals. Lastly, from *C. bucharica*, its closest relative, it is distinguished by its narrower growth and ovate bracts. June–July.

Rocks, 900–2,200 m. — Centr. Asia: Pam.-Al. (species confined to northern slope of the Turkestan Range). Endemic. Described from the Basmandinskoe Pass. Type in Leningrad.

Note. Korshinsky, disagreeing with Prain, united *C. schelesnowiana* with *C. adunca* Maxim. The difference is not only that the leaves of *C. schelesnowiana* are pinnate and those of *C. adunca* bi-tripinnate but, moreover, the lobules of *C. schelesnowiana* are larger, fleshy, and glaucous, the inflorescence branching and not simple, the capsules slightly flexuous and not erect, strongly spreading and not upright, and the flowers narrower than in *C. adunca*. *C. adunca* grows in Kansu, Mongolia, and in Northern China. The complex group of very closely allied species, which includes *C. kaschgarica*, *C. schelesnowiana*, *C. bucharica*, *C. pseudoadunca*, *C. paniculigera*, and *C. chamiensis* m., extends throughout Tien Shan, from Bogdo Ola (Hami province, Nanshang Kou pass) in the north in Pamir-Alai to Gilgit. If this group is merged into one species — an operation for which there is some basis — then it should be called *C. kaschgarica* (1869), the earliest name referring to it. — The closely related species *C. flabellata* Edgew. and *adianthifolia* Hook. et Thoms. grow in Karakorum and the Eastern Himalayas.

47. *C. paniculigera* Rgl. et Schmalh., Descript. pl. nov. Fedtschenko lect. in Izv. Obshch. Lyub. Est. Antr. i Etn. XXXIV, 2 (1882) 3.

Perennial, forming large tufts; stem base and crowns of the much branched roots densely covered with decayed petioles; stems rather tall but thin, with thin delicate branches; leaves glaucous, strongly dissected resembling the leaves of *Ruta graveolens* L.; segments pinnatisect into small, oblong, acute lobes. Racemes terminal, elongated, loose, branching proximally; lower branches in axils of cauline leaves, bearing 2 or 3, rarely 5–7 flowers; sometimes raceme simple; pedicels thin, rather long, 5–20 mm; bracts linear-lanceolate, scarious, entire, shorter than the pedicels; sepals minute, scarious, dentate; flowers broader; spur short, ca. 4 mm, obtuse. June. (Plate XLIV, Figure 4).

Rocks, central mountain zone. — Centr. Asia: Pam.-Al. (Alai Range, mountain pass near Shakhimardan, between Karakuzuk and Shakhimardan; Kul-Kutban Lake, Akbura River), T. Sh. Endemic. Described from the Alai Range (between Karakuzuk and Shakhimardan). Type in Leningrad.

Note. Var. *latiloba* m. conforms to the type, but has broad lobes, similar to those of *C. kaschgarica* and *C. schelesnowiana*. Alai Range: Kichik-Alai valley, Gatyra River; Tien Shan: Uch-Kul River valley.

48. *C. kaschgarica* Rupr. in Mém. Acad. Sc. Pétersb. XIV no. 4 (1869) 38.

Perennial; stems lower, 10–20 cm high, slightly stouter and more compact; leaves broader, with few dissected segments; lobes rounded-obtuse or obtuse, ovate, fleshy. Raceme short, crowded, branching proximally but often simple; pedicels thicker, usually ca. 5 mm; bracts short-ovate, scarious-margined, rarely herbaceous; sepals ca. 3 mm long, conspicuous, ciliate-dentate; long-acuminate. Corolla as in *C. schelesnowiana*. June–July.

Rock crevices. — Centr. Asia: T. Sh. (Near Bedel mountain pass). Gen. distr.: Dzu.-Kash. Described from the southern slope of Tien Shan in Teshiktash-Karaul. Type in Leningrad.

Note. In Fergana (Pamir-Alai area) there occur specimens transitional between *C. paniculigera* and *C. kaschgarica*. Their flowers are longer than those of *C. kaschgarica* but differ from those of *C. paniculigera* by their broader lobules, and rather short racemes. Such specimens are from Maili-Sary-bie (Kushakevich, 2 VI 1878). Between Iordan and Karakauz (O. Fedtschenko, 9 VII 1871. One of the authentic specimens of *C. paniculigera*); near the Kara-Kazyk-Davan Pass (Skornyakov, 28 VI 1878).

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49. *C. pseudoadunca* M. Pop. sp. nova in Addenda VI, p. 582. — *C. adunca* Korsh. in Bull. Ac. Petersb. ser. V, vol. IX, 405 (non Maxim).

Perennial, apparently not forming tufts, and with crowns less covered with decayed petioles; stems 20–40 cm high, rather stout, firm, more rounded, finely sulcate; leaves slender, nearly tripinnatisect, with small, oblong lobules; blades broad; segments petioled; lobes sessile, resembling *C. adunca* but slightly broader. Racemes basally branching

or simple, rather long but with crowded flowers; bracts linear-lanceolate, scarious, short; pedicels of medium-length, ca. 5 mm, slender, fruiting pedicels strongly patent; sepals minute, ca. 1 mm long, scarious, dentate; corolla ca. 15 mm long; outer petals nearly without mucro; spur short, 3–4 mm long, suberect, obtuse; capsules nearly pendulous, long, narrow, to 25 mm long, 2 mm broad. — Distinguished from *C. paniculigera*, the leaves of which are similar — by the compact raceme; segments petioled and more dissected; lobules smaller; tufts apparently smaller than those of *C. paniculigera*. June–July. (Plate XLIV, Figure 6).

Stony slopes. — Centr. Asia: Pam.-Al. (Alai Range in the Taldyk-Su River, Sufi-Kurgan, Ol'gin Lug, between Sufi-Kurgan and Ak-Bosaga, northern road, Taldyk Pass; Trans-Alai Range near the mouth of the Kyzyl-Su). Endemic. Described from Alai Range (Gulcha). Type in Leningrad.

Note. The interpretation of *C. adunca* var. *alaica* Korsh., l.c., (natural boundary Tarosh, 10,000, on marly bluffs. Korshinsky 24 VI 1895), is doubtful as the type specimens are badly damaged. On the strength of the preserved leaves one might accept it as a distinct small species with three leaves nearly four-times dissected into linear lobules; leaves are similar to those of the Umbelliferae; inflorescence and flowers unknown. Close to *C. stricta* but leaves broader, segments long-petioled, lobules larger and not so crowded, bracts broad, sepals small, capsules narrower and less pendulous, plant branching throughout.

50. *C. pseudostricta* M. Pop. sp. nova in Addenda VI, p. 581.

Perennial; stems numerous, sharply faceted-sulcate, as in *C. stricta*, 30–60 cm high, strongly branching almost from base; leaves glaucous, with broad blade, with compact faceted petioles; blade bi- nearly tri-pinnatisect; the 4–5 pairs of segments separated but not overlapping, long-petioled, lobes sessile, cuneate, spreading, not overlapping, palmately dissected or incised into 2–3 short, oblong-linear or slightly cuneate, entire or dentate, acute lobules. Racemes terminal on stem and branches, capitate at first, becoming elongated, most often simple, rarely branching, lower flowers caducous, sterile; pedicels short, upright, simple, not longer than 5 mm; bracts linear, scarious, the lower slightly shorter, the upper longer than the pedicels; sepals oblong-lanceolate, slightly dentate, long-acuminate, ca. 4 mm long; corolla yellow, ca. 18 mm long, slightly curved; outer petals with 1–1.5 mm long mucro, spur short, ca. 3 mm long, saccate, obtuse, slightly pendent; capsules linear, patent-pendulous, presumably to 20 mm long, 2–3 mm broad, acute. June.

Red sand rocks, ca. 2,000 m. — Centr. Asia: Pam.-Al. (spurs of the Gissar Range, near Tash-Kurgan village, M. G. Popov, 1136–40, 1073–76). Endemic. Described from Tash-Kurgan. Type in Tashkent and Leningrad.

Note. Apparently very similar specimens from Turkestan Range are inadequate: northern slope, slates near Auchi village, Drobov, 1927, No. 133; Sary-Tenga Pass near Auchi, Knorring, 1913, No. 493–492; to the north of Tagiz village near the Bargan Pass, Knorring, 1913, No. 433. — This species is very close to *C. stricta* Steph., on the one hand, and to *C. bucharica*, on the other. From the former it is distinguished by broader leaves with remote segments and lobes, a very profusely branching stem, and very loose

raceme; from the latter it is distinguished by a much more sharply faceted stem (as in *C. stricta*) more dissected leaves, and larger sepals.

51. **C. macrocalyx** Litw. in Trav. Mus. Bot. Ac. Pétersb. I (1902) 30–31. — Exs.: HFR no. 479.

Perennial; root stout, long, multicapital, the plants forming cushions; short branches of underground rootstock covered with old squamiform petiole leaves; radical leaves in bundles, to 15 cm high; petioles thin, weak, gradually thickening only at base, triangular, whitish (this part of the petioles preserved); blades green or slightly glaucescent, oblong, ca. 5–6 cm long, ca. 2 cm broad, usually much shorter than petioles, bipinnatisect; segments short, with approximate, sessile lobes; lobes dissected into linear or spatulate-linear, small, obtuse, stoutish lobules; stems leafless, shorter than leaves or as long in fruit, rather thin and weak. Raceme short, capitate at first; bracts scarious, oblong, entire, slightly boat-shaped, acute, 10–15 mm long; pedicels thin; peduncles to 10 mm long and then patent or recurved; sepals very large, ca. 12 mm long, thinly scarious, boat-shaped, acute, resembling the bracts, margin scarious, slightly dentate; corolla yellow, ca. 16–20 mm long, broad, outer petals with large broad limb, markedly overlapping the narrow inner petals; spur very short, 2–3 mm long, saccate, erect; capsules oblong or lanceolate, flat, 10–25 mm long, 5 mm broad, patent; style 8 mm long, triangular-hastate, bifid; seeds black, dimly-glossy (due to punctulation), ca. 1.5 mm long; caruncle flattened-capitate, mushroom-shaped, sessile, spongy-pitted. June. (Plate XLIV, Figure 3).

Limestone rocks, rare. — Centr. Asia: Mtn. Turkm. (Kopet Dagh, Karanki and Firyuza mountain passes). Endemic. Described from Karanki pass. Type in Leningrad.

Note. *C. macrocalyx* is referred to the polymorphic species group *C. rupestris* Boiss. et Ky., distributed in the mountains of Iran, Baluchistan, and, probably, Afghanistan. It is distinguished from all other representatives of this group by the very large sepals exceptional in this genus. The cycle most closely related to the *C. rupestris*–*macrocalyx* cycle is the group *C. stricta*–*C. adunca*–*C. kaschgarica*, the first distinguished from the second by leafless stems, broad capsules, and a spongy-dentate, not flattened, pileiform, corymbiform smooth caruncle.

Section 8. **OOCAPNOS** M. Pop. — Root and leaves like *Calocapnos* but corolla white-violet and capsules bladdery-inflated, indehiscent. — Two species: *C. fedtschenkoana* in Central Asia; *C. crassifolia* in the Himalayas.

52. **C. fedtschenkoana** Rgl. in Rgl. et Schmalh., Descrip. pl. nov. Fedtschenko lect. in *Isv. Ob-va Lyub. Est., Antr. i Etnogr.* XXXIV, 2 (1882) 3; Lipsky in *A. H. P.* XXIII, 18. — Ic.: Lipsky, l. c., tab. 1; Fedchenko, *Rast. Turk.*, 427.

Perennial; root not stout, vertical, fibrous, branching; root crown surrounded by large, scarious, blackish brown sheath; radical leaves few, with rather large, stout, basally much broadened petioles, usually shorter

than blade; blades glaucous, fleshy-stoutish, oblong, 10–20 cm long, bipinnatisect; segments alternate, crowded on stout, flat rachis, nearly pectinate, sessile, pectinately dissected into small, ovate, strong-toothed or pinnately incised lobes; teeth or lobules ovate, obtuse or with prickly mucro; stem usually shorter than leaves, 10–15 cm tall, flexuously ascending, in upper part with 1–3 reduced, pinnate leaves resembling single segment of radical leaf and not overtopping inflorescence. Raceme simple, dense, short, capitate, barely elongating in fruit; lower bracts herbaceous, cuneate, incised, the upper entire, subscarios, oblong or lanceolate, shorter than inflorescence; inflorescence declinate, thin, 10–15 mm long; sepals scarious, 2–3 mm long, incised-dentate; corolla whitish, petals with violet apical spot, ca. 20 mm long, rather stout; lip of outer petals rounded-ovate, with small mucro, slightly longer than inner petals; lower petals convex-gibbous beneath; spur erect, slightly curved basally, obtuse or convex-obtuse, one-half to twice as long as the length of the petals; capsules upright, globular or oval-globular, large, inflated, 20–35 mm in diameter, with scarious, often violet net-veined walls, terminating in a slender style; stigma disklike, verrucous-dentate; seeds brown, ca. 2 mm long, angular; caruncle small, hat-shaped, adhering to seed, scarious, fimbriate-dentate. July–September.

Damp, black slate rock streams in the alpine zone, 2,700–3,900 m. – Centr. Asia: T. Sh. (W. and C. T. Sh.), Pam.-Al. Endemic. Described from Fergana. Type in Leningrad.

Section 9. **OREOCAPNOS** M. Pop. – Rootstock very short, producing bundles of strong adventitious roots, its tip bearing large (to 15 mm long) triangular, scalelike bracts, the outer of which are scarious, bladeless, the inner fleshy, terminating with radical leaves [sic!]; stems emerge from axils of scales. Small, inconspicuous herbs, with small flowers and ternate leaves.

53. **C. inconspicua** Bge. in Ldb., Fl. Ross. I (1842) 104; Bush, Fl. Sib. i Dal'n. Vost. I, 50; Kryl., Fl. Zap. Sib. VI, 1247. – Ic.: Bush, l. c., 51.

Perennial; stems 4–8 cm tall, slender, delicate, white below, branchless, creeping among stones; radical leaves longer than or as long as stem; petioles long, slender, longer than blade; blade small, twice ternate, segments approached, short-petioled, pinnately dissected nearly to base into 2–3 obovate lobes which in turn are incised into 2–3 linear-oblong, obtuse, overlapping lobules; cauline leaves usual 2 or 3: one or none at middle of stem and two towards inflorescence; cauline leaves short-petioled, the upper subsessile, smaller, less dissected than the radical leaves; all leaves glaucous, slightly fleshy, with small blue points beneath; bracts entire, oblong-spatulate, barely longer than inflorescence, with blue points; lower bracts sometimes similar to terminal leaf; sepals minute, 0.5 mm broad, scalelike. Corolla ca. 12 mm long, pink, spur as well as lower side sometimes yellowish; line of outer petals small, acute; lower outer petals inflated but without gibbosity and quite without spur; spur two-thirds the length of petals, rather thin, obtuse, slightly reflexed; capsules pendulous, small narrowly elliptic, acute, 10 mm long, 3 mm broad, on erect 5–7 mm long

pedicels; style 1–1.5 mm long, slender; stigma obcordate, angular below, not verrucose-dentate margined, with stigmatic tissue all along the margin. July.

Stony taluses in the alpine zone. — W. Siberia: Alt. (along Chuya River); E. Siberia: Ang.-Say. (Sayans). **Gen. distr.:** Mong. Described from the Altai Mountains, Chuya River region. Type in Leningrad.

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54. **C. tenella** Kar. et Kir. in Bull. Soc. Nat. Mosc. XV, 1 (1842) 143; Ldb., Fl. Ross. I, 747. — *C. kareliniana* Pritzel in Walp. Repert. bot. II (1843) 750.

Perennial, very similar to *C. inconspicua* in all characters, but distinguished from it as follows: plant slightly larger, 5–15 cm tall; leaves usually with entire lobes, broader than in *C. inconspicua*; bracts and pedicels longer; peduncles markedly longer than bracts, up to 15 mm; corolla ca. 15 mm [in diameter] consistently pink-violet; spur nearly as long as petals; capsules narrower, ca. 2 mm broad. June–July, (Plate XLIV, Figure 5).

Alpine zone among stones, rare. — Centr. Asia: Dzu.-Tarb. (Dzungarian Ala-Tau), T. Sh. (Centr. T. Sh.), Pam.-Al. (Turkestan Range). Endemic. Described from Dzungarian Ala-Tau. Type in Leningrad.

Section 10. **SOPHOROCAPNOS** Turcz. in Bull. Soc. Nat. Mosc. (1841) 570. — Biennial plants with vertical root, tall stems, tripinnatisect leaves and large yellow flowers; capsules pendulous, elongated, beaded.

55. **C. pallida** Pers., Syn. II (1807) 270; Kom., Fl. Manchzh. II, 345; Bush, Fl. Sib. i Dal'n. Vost. I, 40. — *C. speciosa* Maxim. in Rgl., Gartenflora (1858) 250; Prim., Fl. Amur. (1859) 39 et 460. — *C. wilfordii* Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 148. — *C. maximowicziana* Nakai in Bot. Mag. Tokyo XXXIII (1919) 51. — Ic.: Gartenflora, tab. 343; Bush, l.c.; Bot. Mag., tab. 6826, No. 1303.

Biennial; root short, with numerous lateral roots; radical leaves in a rosette, drying up before flowering; stems 1–5 from one rosette, upright or ascending, green, rounded-angular, with several branches in upper part, rather densely leafy; lower leaves petioled, the upper sessile; segments alternate, 4–6 pairs, of which the lower strongly spreading, short-petioled, oblong, lobes sessile, remote, obliquely decurrent on segment rachis, ovate or oblong, pinnately incised into linear or oblong lobules or teeth, rarely subentire. Long raceme terminating the main stem moderately loose, as are also the reduced racemes which terminate the lateral branches; bracts entire or the lower slightly dentate, small, oblong or lanceolate, acuminate, about as long as pedicels; sepals small, ca. 1 mm, scarious, orbicular, with large broad teeth; corolla yellow, 17–23 mm long, rather stout; limb of outer petals large, rounded-ovate, obtuse; inner petals noticeably shorter than the outer; lower petal slightly convex; spur stout, suberect, inflated-obtuse distally, one and one-half times as long as petals; peduncles horizontal or even declinate, 5–10 mm slender; capsules slightly pendulous, linear, elongated, distinctly beaded, 20–30 mm long, ca. 2 mm broad, erect or slightly arcuate, terminating in a long style; stigma much broader than long, nearly 2-lobed, with 6 stigmatoid appendages,

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seeds black, glossy, ca. 2 mm across, with punctate edge; caruncle in the form of a scarious hood, firmly enveloping the ventral half of the seeds. April—June.

Forest clearings, windbreaks, burned areas, forest edges, glades, stony taluses on open slopes, and gravels along streams and rivers. — Far East: Uda, Uss., Sakh. **Gen. distr.:** Jap. -Ch. Described from Japan.

Note. I found no differences between the Soviet and the Japanese specimens, beyond a slightly shorter spur in the Soviet specimen, and I do not see sufficient reasons to separate *C. speciosa* Maxim. as a special species. Incidentally, I failed to find the name *C. speciosa* Willd., which prompted Nakai to change the name of the Soviet plant into *C. maximowicziana*; Nakai apparently accepted the name *C. spectabilis* for *C. speciosa*.

The Soviet Far Eastern plant is rather polymorphous and Komarov and Bush have distinguished three varieties: var. *typica* Busch, with pale flowers and loose racemes; var. *speciosa* (Maxim.) Kom., with dense racemes and golden yellow corolla; var. *ramosissima* Kom., with a strongly branching decumbent stem, few-flowered racemes, and pale yellow flowers with white spurs.

Section 11. **GLAUCAE** M. Pop. — Biennial plants; radical leaves pinnatisect; cauline leaves ternate; corolla yellow, medium-sized, with a short spur; capsules upright, long, siliquiform, narrowly linear.

56. *C. sempervirens* (L.) Pers., Syn. II (1807) 269; Kryl., Fl. Zap. Sib. VI, 1241. — *Fumaria sempervirens* L., Sp. pl. (1753) 700. — *F. glauca* Curt., Bot. Mag. (1795) 179. — *Corydalis glauca* Pursh, Fl. bor.-amer. II (1814) 463. — Ic.: Curtis, l.c., tab. 179.

Biennial; stem upright, 30–50 cm high, branching; radical leaves pinnate-oblong and acute, or oblong and obtuse. Racemes at ends of branches reduced, few-flowered, in fruit often umbelliform, sometimes branching; bracts small, linear-lanceolate, acute, much shorter than the long upright pedicels; sepals large, to 2–3 mm ovate, acute, denticulate, scarious; corolla stout, suberect, ca. 15 mm long; line of outer petals short, acute; inner petals with a broad, pteroid keel; spur short, one-third the length of the petals, obtuse; capsules linear, erect, siliquiform, 3.5 cm long, 1.5–1.8 mm broad; seeds scarcely 1 mm across, punctulate; caruncle linear, appressed to seeds, extending along one-third of their circumference. Distinguished from all endemic Soviet species by its very long siliquiform, upright, umbelliform capsules. June—July.

Weed, introduced by chance from N. America. — W. Siberia: Alt. (Altai Province, Barnaul County, in the neighborhood of Pavlovsk village, pine forest, felling area, Krylov, l.c.; specimens not seen). **Gen. distr.:** N. Am. Described from N. America. Type in London.

Section 12. **MICROCAPHOS** M. Pop. — Annual or biennial plants, with thin, acutely ribbed or winged stem; leaves bi- or triternate, not pinnate; sepals small; crown small, yellow. Includes the Soviet species *C. longipes* DC., as well as *C. filiformis* Royle of the Himalayas and *C. flavula* (Raf.) DC. of North America.

1. Corolla small, shorter than 10 mm. Spur erect, nearly half the length of the petals 2.
- + Corolla larger, 11–20 mm long. Spur slightly shorter or as long as petals, reflexed 3.
2. Capsules linear, ca. 2 mm broad, with 1 row of seeds. Lower petal not torulose at base. Lower bracts dissected 61. *C. impatiens* Fisch.
- + Capsules oboblong, broadened distally, with 2 rows of seeds. Lower petal with basal spurlike tubercle, bracts entire 60. *C. sibirica* Pers.
3. Flowers 11–13 mm long. Racemes not overtopping leaf, few-flowered. Lower bracts leaf-shaped, ternate. Peduncles long. Capsule linear. Caruncle conical-corniform, tall 57. *C. capnoides* (L.) Pers.
- + Flowers 15–18 mm long. Racemes many-flowered, overtopping the leaves. Bracts oval or ovate, not leaf-shaped; peduncles short. Caruncle small, flattened 4.
4. Capsules linear, ca. 2 mm broad, with one row of seeds 59. *C. raddeana* Rgl.
- + Capsules oboblong, broadened distally, with 2 rows of seeds 58. *C. ochotensis* Turcz.

57. *C. capnoides* (L.) Pers., Syn. II (1807) 270 (p.p.); Koch, Syn. d. Deutsch. Schw. Fl. ed. 2, I (1846) 77; Ldb., Fl. Ross. I, 103, 747; Bush, Fl. Sib. i Dal'n. Vost. I, 48; Kryl., Fl. Zap. Sib. VI, 1240. — *Fumaria capnoides* L., Sp. pl. (1753) 700 (pp.); Mant. II (1771) 437. — *Corydalis uralensis* Fisch. ex DC., Syst. II (1821) 127; Ldb., Fl. Ross. I, 104. — *C. gebleri* Ldb., Ind. sem. Horti Dorp. (1823) 3; Turcz., Fl. baic.-dah. I, 104. — Ic.: Ldb., Ic. pl. Fl. Ross. tab. 49; Bush, l.c., 50. — Exs.: Fl. exs. austro-hung. No. 2078.

703 Annual or biennial; stems usually few from one root, ribbed-sulcate, with acute ribs, with spreading branches, 10–40 cm tall, leafy to apex; cauline leaves with long petiolules, broadening but slightly from base; blade delicate, broad, bi-, nearly triternate, segments with short petiolules, lobes sessile, obovate-cuneate, incised to base or to two-thirds into 2–3 linear-oblong or oblong lobules, these sometimes laciniate into obtuse, rarely acute, lobes. Racemes short, few-flowered, not overtopping leaves, divergent in fruit; lower bracts leaf-shaped, ternate or biternate, the upper broadly linear, entire or few-toothed, much smaller than the lower leaf-shaped bracts; pedicels long, slender, the lower to 10–15 mm long, shorter than the bracts, fruiting pedicels spreading; sepals less than 1 mm long, scarious, denticulate; corolla slender, 11–13 mm long, petals pale yellow, sometimes greenish distally; limb of outer petals very narrow, ovate, acute, slightly longer than inner petals; lower petal somewhat convex basally, but not torulose; spur slender, slightly shorter than petal, arcuate; capsules spreading or pendulous, linear, to 25 mm long, 2 mm broad, acute; stigma obcordate, with short, retrorse horns at base; stigmatoid surface continuous along distal cordate edge; seeds ca. 1.5 mm across, smooth not punctate; caruncle conical-corniform, appressed to seed. April – June.

Stony slopes, gravels, and rocks in forests. — European part: Dv.-Pech., V.-Kama (Urals); W. Siberia: Ob, Irt., Alt.; E. Siberia: Ang.-Say., Yenisei, Lena-Kol., Dau.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. (rarely). **Gen. distr.:** Centr. Eur., Mong., Tib. Described from Europe. Type in London.

Note. The nomenclatural history of this species is very complicated. Linnaeus (Sp. pl. 700) considered *F. capnoides* a mixture of three species, one of which, *F. lutea* L. (Mant. II, 248) was separated even in his time. *F. capnoides*, once *F. lutea* was separated, was called *C. capnoides* (from Helvetia, Carniolia, Italia, Gallia) by Persoon (1807), Willdenow (1809), and others. In 1846, Koch separated yet another species, close to *C. lutea* — a perennial plant with deciduous styles, *C. ochroleuca*, based on a plant from Carniolia earlier included as *F. capnoides*. In fact, Koch was the first to define *C. capnoides* as here accepted; therefore, the much used *C. capnoides* (L.) Koch is a combination which Koch never published. Wahlenberg, often cited as author, did nothing to clarify the matter; he merely quotes the names and the descriptions of Persoon and Willdenow, and therefore it appears a misunderstanding to attribute the species to him.

58. ***C. ochotensis*** Turcz. in Bull. Soc. Nat. Mosc. (1840) 62; Ldb., Fl. Ross. I, 103; Kom., Fl. Manchzh. II, 347; Bush, Fl. Sib. i Dal'n. Vost., 43 (p.p. excl. syn. *C. raddeana* et tab.). — *C. sibirica* var. *ochotensis* Rgl. in Bull. Soc. Nat. Mosc. XXXIV (1861) 143.

04 Annual or biennial; stem 25–60 cm high, often weak, markedly flexuous, strongly ribbed-sulcate below, subulate along ribs, sulcate above, often branching, leafy from base; radical rosettes lacking; cauline leaves petioled, slightly broadened basally, lower leaves long-petioled, the upper short-petioled; lamina broad, triternate; segments with long, slender petiolules, lobes with much shorter but distinct petiolules, to 1.5–3 mm long, lobules sessile; lobes obovate, short, rarely entire, often deeply incised into 2–3 oboblong, obtuse or acute lobules; leaf consistency delicate. Terminal racemes on stem and branches few-flowered, loose, especially narrow in fruit; bracts large, entire, 1.5–2 times as long as peduncle, nearly submembranous, ovate or oval, acute; sepals ca. 1 mm broad, angular, the margin denticulate, scarious; corolla yellowish, 15–18 mm long, broad; limb of outer petals ovate, acute or obtuse, longer than the inner petals; lower petals convex-gibbose; spur slightly reflexed, rather slender, barely as long as petal, capsules declinate or obliquely pendulous, oboblong as in *C. sibirica*, gradually tapering towards base, obtuse, terminating in a slender style, 3–4 mm broad, 8–12 (–17) mm long; stigma obtrapeziform, with delicate verrucous-torulose edges; seeds small, 1.3 mm across, black, glossy, not punctate, with a very minute, dot-like caruncle. June–July. (Plate XLIV, Figure 1).

Shady forests, rocks, rivers and streams. — Far East: Ze.-Bu., Uda, Uss., Okh. (Obviously introduced into the last). **Gen. distr.:** Jap.-Ch. Described from Okhotsk. Type in Leningrad.

Economic importance. Vigorously growing ornamental, readily cultivated from seed; perhaps also sowing itself.

59. *C. raddeana* Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 143. — Ic.: Rgl., l. c., tab. IV, f. 10; Bush, Fl. Sib. i Dal'n. Vost. I, 44 (under the name *C. ochotensis* Turcz.).

Very similar to *C. ochotensis*. Leaves more delicate; stems much thinner, less flexuous, ribs less winged; bracts two to three times smaller than *C. ochotensis*, rounded-oval, the upper oboblong; sepals smaller than *C. ochotensis*, capsules linear, not broadened distally, 2–2.5 mm broad; seeds similar to those of *C. ochotensis*, but caruncle slightly longer, in the form of a small tongue. July–August. (Plate XLIV, Figure 2).

Forests. — Far East: Ze.-Bu. **Gen. distr.:** Jap.-Ch. (Japan, Peking). Described from Bureya Range. Type in Leningrad.

705 60. *C. sibirica* (L. f.) Pers., Syn. II (1807) 270; Ldb., Fl. Ross. I, 103; Turcz., Fl. baic.-dah. I, 105; Bush, Fl. Sib. i Dal'n. Vost. I, 45 (p.p. excl. *C. impatiens*); Kryl., Fl. Zap. Sib. VI, 1242 (p.p. excl. *C. impatiens*). — *Fumaria sibirica* L., f. Suppl. (1781) 314; Willd., Sp. pl. III, 2 (1800) 864. — *C. breviflora* DC., Syst. II (1821) 127; Ldb., Fl. Ross. I, 104. — Ic.: Gmel, Fl. sib. IV, 65, tab. 33; Bush, l. c., 47.

Annual or biennial; stem upright, ribbed-sulcate, branching from base or middle, divergently leafy, 20–70 cm high, weak, the ribs subulate, acute; leaves with long basally broadened petioles, bi- or nearly triternate; segments with long slender petiolules, lobes with short petiolules, lobes cuneate, broad, deeply palmately or pinnately dissected into linear or oblong-linear, acute lobules; leaf consistency delicate. Terminal racemes of stem and branches slightly crowded at flowering, elongating in fruit, narrow; bracts oblong or lanceolate, small, acute, longer than the short pedicels, sometimes violet; sepals scarious, white, ca. 1.0–1.5 mm broad, denticulate or incised; corolla 7–9 mm long, petals yellow or pale yellow, sometimes with apical violet spot, broad; limb of outer petals small, ovate, acute, often obscurely-toothed; lower petals gibbose, sometimes calcariform-gibbose at base; spur short, slightly antrorse, stout, obtuse, erect, short, sometimes nearly half the length of the petal; capsules 5–15 mm long, horizontally declinate or pendulous; oboblong, broadest distally (3–4 mm), cuneately flattish, rounded-obtuse, terminating in a slender style; stigma square, with 4 stigmatic protuberances; seeds black, glossy, not punctate, ca. 1.5 mm, with minute caruncle. May–June.

River gravels, forest clearings, and roadsides. — European part: V.-Kama (isolated habitat in the Urals); W. Siberia: Alt.; E. Siberia: Yeniss., Ang.-Say., Lena-Kol., Dau.; Far East: Okh., Uda, Ze.-Bu., Uss. **Gen. distr.:** Mong. Described from Siberia. Type in London.

61. *C. impatiens* (Pall.) Fisch. in DC., Syst. II (1821) 124; Ldb., Fl. Ross. I, 103; Turcz., Fl. baic.-dah. I, 105. — *Fumaria impatiens* Pall., Reise III (1776) 286. — *C. sibirica* var. *impatiens* Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 143; Bush, Fl. Sib. i Dal'n. Vost. I, 46.

Annual, closely resembling *C. sibirica* in its root, leaves and stem, but stem often ascending and branches more spreading; bracts generally notched, the upper narrow, lanceolate-linear; sepals inconspicuous, minute,

low, dentate-ciliate; flowers as large as in *C. sibirica* but the lower outer petals not gibbose, without a calcariform protuberance; spur more slender; capsules linear, ca. 2 mm broad, not broadened distally, with row of seeds; seeds as in *C. sibirica*. May—June.

Forests, river gravels, and felled areas.—E. Siberia: Ang.-Say., Dau. (mainly around the Baikal area). **Gen. distr.:** Mong. Described from Dauria. Type in Leningrad.

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Tribe **3. FUMARIEAE** RCHB., Handb. d. natürl. Pfl. Syst. (1837) 264.—Sepals scarious, of various sizes, usually small, sometimes absent; inflorescence with lateral racemes opposite the leaves; corolla zygomorphous, as in *Corydaleae*, but usually small, narrow, with short saccate spur or only with protuberance at base of upper petal. Fruit a unilocular, 1-seeded, rarely 2-seeded nutlet.

Genus 560. **FUMARIA** * L.

L. Sp. pl. (1753) 899 (ex p.); Gen. pl. ed. 5 (1754) 314 (ex p.); Hammar, Monogr. Fumar. (1857) 2 (ex p.); Pugsley in Journ. Linn. Soc. XLIV (1919) 250.—*Fumaria* sect. *Sphaerocarpus* DC. Syst. II (1821) 131.

Inflorescences of narrow unbranched racemes with narrow, scarious bracts; sepals squamiform, scarious, readily caducous; corolla small, or minute, usually violet-pink, rarely white, apex of petals often darker, spur single, usually short and saccate; outer petals various: the upper, bearing a spur, are broader, more or less distinctly keeled dorsally, with narrow, acute, obtuse or notched limb, its margin either recurved towards keel or flat; lower petals narrow, linear or spatulately broadened apically, obtuse or notched; nutlet orbicular or orbicular-ovate, 1.5–3.0 mm across, sometimes slightly flattened laterally, apex concave, obtuse or acutish, bearing a small mucro, remnant of the deciduous style. Annuals, with thinly dissected, bi- to tripinnate leaves; segments and lobes often petiolate, lobules oblong-linear, linear and filiform.—All species of the genus are ordinary field and truck garden weeds.

1. Peduncles arcuately recurved; sepals large, half the length of the corolla 2.
- + Peduncles erect, patent, but not recurved (sepals large, medium or small) 4.
2. Fruit torulose-scarious, rounded-ovate; bracts about as long as peduncles; corolla medium-large, to 9 mm long, pink-violet; sepals obscurely-toothed 2. *F. thuretii* Boiss.
- + Fruit smooth or nearly smooth, orbicular, obtuse 3.
3. Corolla to 15 mm long, straw-colored, rarely reddening, dark at apex; leaf lobules broad; bracts scarcely as long as peduncles; nutlets smooth 1. *F. capreolata* L.
- + Corolla 5–7 mm long, pink-violet; leaf lobules narrow, linear-filiform; fruit slightly scarious 5. *F. kralikii* Jord.

* From the Latin *fumus*—smoke, fume.

- 707 4. Sepals larger, broader than corolla, only half as long 5.
 + Sepals narrower than corolla, $\frac{1}{3}$ – $\frac{1}{7}$ the length of the corolla, corolla or sepals wanting 7.
 5. Corolla 5–6 mm long. Fruit orbicular 6.
 + Corolla large, medium-large, 7–8.5 mm long; fruit rounded-ovate, torulose-scabrous *3. *F. pikermiana* Boiss. et Heldr.
 6. Sepals very broad; racemes dense, compact; bracts longer than peduncles; outer petals without mucro 6. *F. micrantha* Lag.
 + Sepals ovate, narrower; racemes loose; bracts nearly as long as peduncle; outer petals with small mucro 4. *F. rostellata* Knaf.
 7. Sepals $\frac{1}{3}$ the length of the corolla, rather conspicuous; corolla violet-pink, 7–9 mm long; fruit not flattened laterally, with strongly concave apex, appearing truncate 7. *F. officinalis* L.
 + Sepals $\frac{1}{4}$ – $\frac{1}{7}$ the length of the corolla, or sepals wanting; corolla 4–7 mm long; fruit conspicuously flattened laterally, slightly keeled, orbicular or pointed, not concave (except for the two, very small pits at base of style) 8.
 8. Upper outer petal narrow, obtuse, with recurved limb; racemes loose, elongated; peduncles slender, two to three times as long as the small bracts, fruit globular-ovate 8. *F. schleicheri* Soy. Will.
 + Peduncles short, stout, nearly as long as the bracts; racemes short at flowering, compact, sessile or subsessile, short-pedicel 9.
 9. Upper outer petal obtuse, its margin flat or slightly curved distally; corolla white, small, ca. 4 mm long, only tips of petals with pink spots; nutlet globular-ovate, acute, strongly torulose-scabrous; peduncles nearly as long as bracts; leaf lobules often filiform, grooved, rarely flat, linear 9. *F. parviflora* Lam.
 + Upper outer petal broad, spatulate, distinctly notched, its margins broad, flat; peduncles as long as or slightly (up to one and one-half times) longer than bracts 10.
 10. Corolla pink-violet, with dark tip; sepals minute, caducous, sometimes difficult to see; fruit quite obtuse, orbicular . . . 10. *F. vaillantii* Loisl.
 + Corolla white with pink apical spots, confined to inner petals; fruit rounded-ovate, acuminate; sepals none; lower and upper petals deeply notched 11. *F. asepala* Boiss.

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1. *F. capreolata* L., Sp. pl. (1753) 701; Hammar, l. c., 24; Pugsley, l. c., 269.— Ic.: Sturm, Deutsch. Flora, ed. II, VI, t. 49; Schlechtend, Fl. v. Deutschl. V. Aufl. XIII, t. 1314.— Exs.: Fl. austro-hung. exs. No. 2899.

Annual; stems 20–30 cm high, branching, sharply faceted; leaves glaucescent, with pinnately arranged segments biternately dissected into linear or oblong-linear lobules terminating in a mucro. Racemes with 4–10 loosely arranged flowers; pedicels rather long, overtopping racemes; pedicels and peduncles recurved or at least horizontal; bracts subscarios, lanceolate-linear, acute; weakly thickened peduncles 1.5–3 times as long as bracts; sepals 4–5 mm long, 2–3 mm broad, ovate, scarious-white, denticulate proximally, persistent; corolla 10–15 mm long, spur stout, saccate, slightly reflexed, petals two to two and one-half times as long as spur; corolla narrow, pale yellow or pink, apices of upper and inner petals dark violet, limb of upper petals acute, recurved, with very narrow margin; lower petals linear, with very narrow margins; nutlets 2–2.5 mm

across, nearly smooth or smooth, rounded, with small cleft at base of style. April - June.

Gardens and parks. - Caucasus: W. Transc. (Sochi, Sukhumi). **Gen. distr.:** Med., Bal. -As. Min., Centr. Eur. Described from southern France (Narbonne). Type in London.

2. **F. thuretii** Boiss., in Diagn. pl. or. sér. 2, I (1853) 15 et Fl. Or. I, 137; Hausskn. in Flora LVI, 494; N. Busch in Fl. cauc. crit. III, 4 (1907) 32; Pugsley, l. c., 292, No. 26. Exs.: Heldreich, Herb. Graec. norm. No. 1005.

Annual; stems 15-30 cm high, branching from base, branches declinate, sharply faceted; leaves glaucous, tripinnatisect, with acute, linear lobules. Racemes subsessile, medium-dense, rather many-flowered; bracts oblong-linear, as long as inflorescence or longer; peduncles reflexed; sepals large, scarious, violet, ca. 3-4 mm long, ovate, obscurely-toothed; corolla ca. 9 mm long, petals pink, dark violet at apex; upper petals obsolete, their margins distally curved to the green keel; spur saccate, ca. 3 mm long, slightly retrorsely curved; nutlets rounded-ovate, ca. 2 mm long, pointed, under magnification finely torulose, nearly smooth. April - May.

Rocks on the southern shores of the Crimea. - European part: Crim. (Yalta, cliffs above Autka, Puring). **Gen. distr.:** Bal. -As. Min., E. Med. Described from Greece. Type in Geneva.

*3. **F. pikermiana** Boiss., et Heldr. in Boiss., Diagn., sér. 2, VI (1859) 9; Fl. Or. I, 137; Haussknecht in Flora LVI, 493; N. Busch in Fl. cauc. crit. III, 4, 72. - *F. thuretii* & *pikermiana* Pugsley, l. c. (1919) 294.

709 Annual; stems rather stout, procumbent and ascending; leaves glaucous, lobules linear; racemes few-flowered, short-pedicel, longer than the opposite leaves; peduncles 3 mm long, erect, rarely oblique or slightly curved; bracts longer than peduncles, 4-5 mm long, lanceolate or linear; flowers 7-8 mm long, pink with dark apex; sepals ovate, 3 mm long, 1.5 mm broad, irregularly dentate, slightly broader than corolla; nutlets globular-ovate, very delicately rugose, slightly flattened, with a very short remnant of a style when young.

As yet unknown from the USSR, but recorded from the former Artvin district (Bush, l. c.); I did not see the specimens. **Gen. distr.:** Bal. -As. Min. Described from Greece. Type in Geneva.

Note. Very similar to *F. thuretii*, but peduncles not reflexed and corolla slightly smaller.

4. **F. rostellata** Knaf in Flora XXIX (1846) 290; Hammar, l. c., 20; Hausskn. in Flora LXI, 518; Pugsley, l. c. 301, No. 301; Shmal'g., Fl. I, 42. - *F. transilvanica* Schur, Enum. pl. Trans. (1866) 38. - Ic.: Hammar, l. c. tab. II. - Exs.: Fl. exs. austro-hung. No. 2902.

Annual; stems 10-30 cm high, loosely branching; leaves glaucous, with linear or linear-oblong acute lobules. Racemes short-pedicel, 1-2 cm long, many-flowered, loose, with spreading flowers; pedicels - as also axis of inflorescence - slender, 2-4 mm long, declinate, erect, not recurved;

peduncles one and one-half to twice as long as bracts; corolla pink-violet, ca. 6 mm long; sepals scarious, rather large, ovate, denticulate, broader than corolla and more than half its length, ca. 2.5 mm long; spur short, saccate, erect; all petals dark violet, with a small mucro; nutlets 1.7 mm long, ovoid, pointed, under magnification minute, torulose-scabrous. June - July.

Fields, rare. - European part: M. Dnp. Gen. distr.: Centr. Eur., Bal.-As. Min. Described from Bohemia (Erzgebirge), where it grows in potato and cabbage fields. Type in Berlin.

Note. *F. rostellata* is clearly distinguished from *F. officinalis* by smaller flowers and pointed nutlets; from *F. schleicheri* by acuminate fruitlets and larger sepals; and from both by a small but distinct mucro of the petals.

5. *F. kralikii* Jordan in Cat. Dijon (1848) 19 et in Linnaea XXIII (1850) 471; Hammar, Mon. 23; Pugsley, l. c., 298, No. 29. - *F. anatolica* Boiss., in Pinard, Pl. de Carie Exsicc. (1842) nomen nudum et Diagnos. pl. or sér. 2, VIII (1849) 14; Hausskn. in Flora LXI, 505; N. Busch in Fl. cauc. crit. III, 4. - Ic.: Hammar, l. c., tab. II. - Exs.: Schultz, Herb. Norm., nov. ser. No. 1912.

710 Annual; stem 10-25 cm high, simple or slightly branched, sometimes branching from base; branches reflexed, sharply faceted; entire plant slender, exquisite; leaves glaucous, tripinnatisect, lobules flat, linear, short-acuminate. Racemes short-peduncled (ca. 1 cm long), loose, elongated, few-flowered; bracts oblong-linear, as long as or slightly longer than peduncles; sepals oval or ovate, broader than the corolla, white-scarious, acutely dentate-ciliate, ca. 2-2.5 mm long; corolla 5-7 mm long, light pink with dark violet apex; spur rather long, ca. 2-2.5 mm, slender, slightly reflexed; upper petal obtuse, its margin reflexed towards the green keel; peduncles recurved; fruitlets small, 1.3 mm across, subglobular, slightly flattened laterally, obtuse, with 2 small pits at base of style, under magnification barely scabrous, nearly smooth. April - May.

Rocks. - European part: Crim. (southern shore - Sevastopol, Massandra, Oreanda, Simeiz, rocks and peaks of Yaila Range near Sarych). Gen. distr.: Bal.-As. Min., Med. Described from France (chance introduction, Marseille). Type in Paris.

Note. *F. thuretti*, which occurs in association with *F. kralikii*, is distinguished by acutely dentate sepals, a slightly smaller corolla and obtuse nutlets.

6. *F. micrantha* Lag., Fl. Hort. Matrit. (1816) 21; Hammar, Monogr. 277; Boiss., Fl. Or. I, 135; Pugsley, l. c. 299, No. 30; N. Busch in Fl. cauc. crit. III, 4, 73. - *F. densiflora* DC., Cat. Hort. Monsp. (1813) 113 (p.p.); Ldb., Fl. Ross. I, 106; Hausskn. in Flora LVI (1873) 507. - *F. calycina* Bab. in Trans. Bot. Soc. Edinb. I (1844) 34. - Ic.: Hook., Ic. IV, tab. 363; Rehb., Icon. Fl. Germ. f. 4451; Hammar, l. c., tab. II.

Annual; stem branching, stoutish, sulcate, 10-30 cm high; leaves glaucescent, thinly dissected, with lanceolate or linear-filiform, flat, obtuse lobules. Racemes subsessile, dense, many-flowered, cylindrical, with crowded flowers; peduncles to 1 mm long, oblique - erect, not recurved; bracts oblong-linear, scarious, longer than the peduncles; sepals large, often violet, broad, rounded-ovate, dentate, almost half the length of the

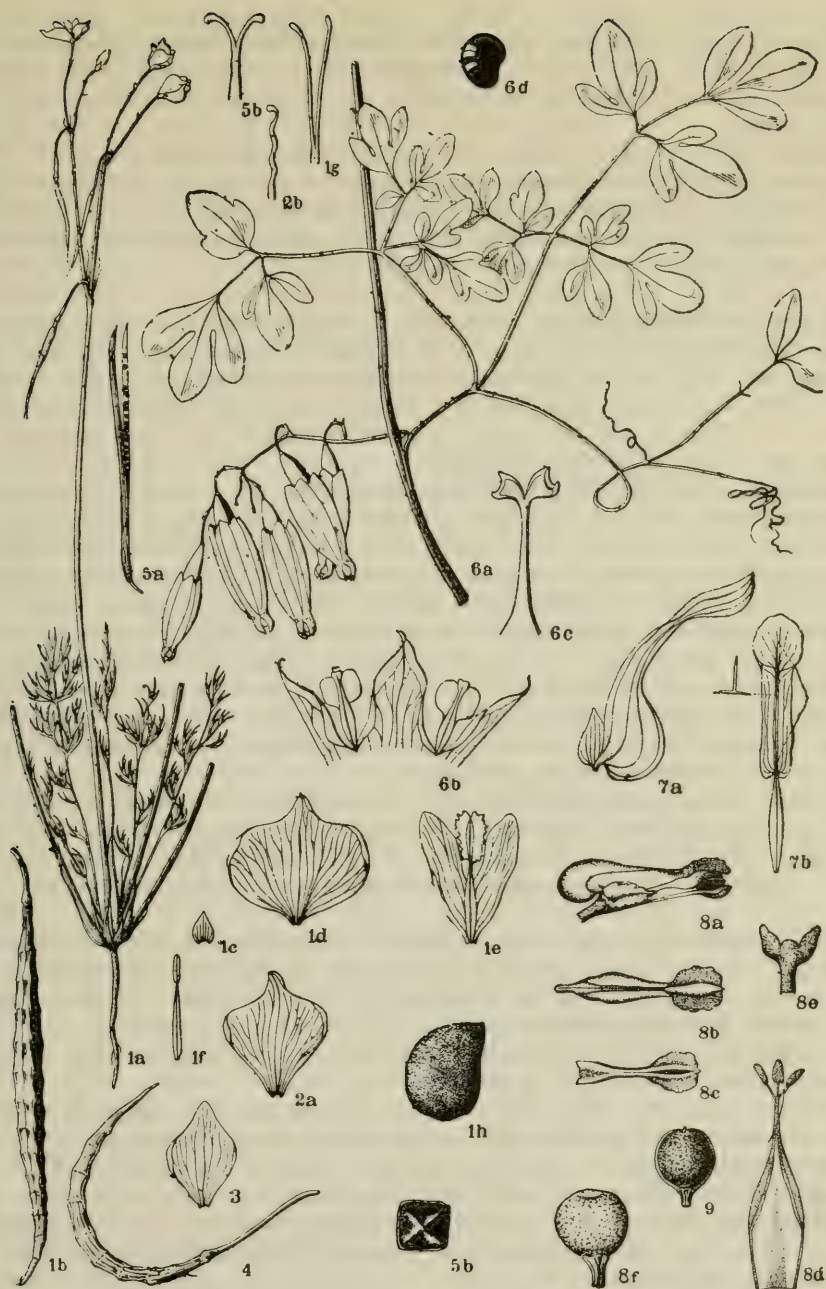


PLATE XLV. 1-*Hypecoum trilobum* Trautv.: a) general view, b) sepals, d) outer petal, e) inner petal, f) stamens, g) stigma, h) seeds; 2-*H. parviflorum* Kar. et Kir.: a) outer petals, b) stigma; 3-*H. pendulum* L., outer petal; 4-*H. grandiflorum* Benth., silique; 5-*H. erectum* L.: a) silique, b) stigma and seeds; 6-*Adlumia asiatica* Ohwi: a) segment of stem, b) corolla limb, c) style and stigma, d) seeds; 7-*Dicentra peregrina* (Rudolphi) Fedde: a) outer petals; 8-*Fumaria officinalis* L.: a) flowers, b) upper petal, c) lower petal, d) stamens, e) stigma, f) nutlet; 9-*F. vaillantii* Loisl., nutlet.

713 corolla and much broader; corolla 5–6 mm long, pink-violet; spur saccate, 1–1.5 mm long; outer petals narrow, almost without limbs, obtuse; nutlet ca. 2 mm across, spherical, torulose, orbicular at apex, with small pit near the punctate remnant of the style, under magnification finely torulose. April – May.

Clayey slopes, weed-infested localities in the semidesert zone. – Caucasus: E. Transc. (Especially common in the Apsheron Peninsula), Tal.; Centr. Asia: Mtn. Turkm. (western Kopet Dag, on the Chandyr River) Gen. distr.: Iran., Med., Centr. Eur., Atl. Eur. (introduced). Described from Spain (Orihuela, Murcia). Type in Madrid.

7. *F. officinalis* L., Sp. pl. (1753) 700; Hammar, l.c., 9; Hausskn. in Flora LXI, 404; Pugsley, l.c., 302, No. 33; Ldb., Fl. Ross. I, 105; Boiss., Fl. Or. I, 134; Shmal'g, Fl. I, 42; N. Busch in Fl. cauc. crit. III, 4, 64; Kryl., Fl. Zap. Sib. VI, 1248; Bush, Fl. Sib. i Dal'n. Vost. I, 72. – Ic.: Rchb., l.c. Fl. Germ. fig. 4454. – Exs.: Fl. exs. austro-hung. No. 2901; HFR No. 1601 a et b.

Annual; stem 15–30 cm high, faceted-sulcate, not densely branching, with spreading branches, leaves glaucous, dissected into numerous flat, linear or oblong, acute lobules. Racemes on 2–3 cm long peduncles, with numerous flowers, medium-dense, becoming loose after flowering; pedicels scarious [sic], oblong-linear, peduncles one and one-half to two times as long as pedicels; flowers rather long, 7–9 mm, narrow, violet-pink, with dark apex; sepals oblong, scarious, dentate, corolla three times as long as sepals; spur reflexed, half as long as petals; petals narrow, without mucro, margins of upper petals recurved, the lower spatulate, obtuse; nutlet ca. 2 mm across, spherical, with large pit, under magnification slightly rough, nearly smooth. June – July. (Plate XLV, Figure 8, a–f).

Fields, fallows, and weedy places. – European part: common everywhere (except Arctic), Crim.; Caucasus: Cisc., Transc. (rarely); W. Siberia: U. Tob., Ob; E. Siberia: Angl.-Say. (very rarely). Gen. distr.: Bal.-As. Min., Med., Centr. Eur. Described from Europe. Type in London.

8. *F. schleicheri* Soy.-Will., Observ. Pl. France (1828) 17; Hausskn. in Flora LVI, 411, 485; Shmal'g., Fl. I, 42; N. Busch in Fl. cauc. crit. III, 4, 68; Pugsley, l.c., 310, No. 40. – *F. meyeri* Stev. in Bull. Soc. Nat. Mosc. (1856) II, 288; Rupr., Fl. Cauc. 54. – Ic.: Hammar, l.c., tab. I (under the name *F. wirtgeni*). – Exs.: Flora exs. Austro-hung. No. 2903; Schultz, Herb. Norm. No. 2109; HFR No. 1602.

714 Annual; stem 10–30 cm high, branching from base, branches upright or reflexed, usually elongated, well-proportioned; leaves glaucous, bi- or tripinnatisect, with flat, short, linear or filiform lobules. Racemes loose, elongated, many-flowered, on slender peduncles 1–1.5 cm long; inflorescence and peduncles slender, 2.5–4 mm long, two to three times as long as the reduced bracts; corolla pink-violet, slender, 5–6 mm long, with a dark apical spot; upper petal obtuse, not notched, its narrow margin abruptly curved upward; spur rather slender, reflexed, half the length of the petals; sepals very small, less than 1 mm long, narrow, caducous; nutlet orbicular, laterally compressed, distinctly keeled, with small distinct mucro, under magnification minutely punctate-torulose, ca. 2 mm long. June – July.

Fields, fallows, and weedy places. — European part: M. Dnp., V. -Don, Transv., Bl., Crim., LD., L.V.; Caucasus: Cisc., Dag., Transc.; W. Siberia: Alt., Irt.; Centr. Asia: Dzu-Tarb., Balkh., T. Sh. (eastern part of to Alma Ata). Described from Switzerland.

Note. The typical *F. schleicheri* is very rare in Transcaucasia, where the form with thicker corolla, dense racemes and shorter peduncles is distributed. It appears to agree with what Haussknecht and Pugsley describe as *F. microcarpa* Boiss., in herb. and, in all probability, represents a hybrid between *F. schleicheri* and *F. vaillantii*. It is encountered in the Lower Volga and Transvolga areas. In the extreme southeast, in the foothills of Altai, Tarbagatai, Dzhungarian Ala-Tau, and eastern Tien Shan, grows the atypical *F. schleicheri*, with stouter and paler corolla, denser racemes, coarser and stouter peduncles. Haussknecht, nevertheless, determined it as *F. schleicheri*.

9. ***F. parviflora*** Lam., Encycl. meth. II (1788) 567; Hammar, l.c., 16; Ldb., Fl. Ross. I, 105; Hausskn. in Flora LVI (1873) 456; Pugsley, l.c., 322, N. 46. — Ic.: Sturm, Deutschl. Flora, I, 62, tab. 16. — Exs.: Fiori et Béguinot, Fl. Exs. Ital. No. 1051.

Annual; stem 10–20 cm high, profusely branching from base, slightly faceted; leaves glaucous, tri-quadripinnatisect, with short, filiform lobules often longitudinally folded. Racemes sessile, few-flowered, short, dense, elongating in fruit; bracts lanceolate, as long as or slightly shorter or slightly longer than peduncles; peduncles stout, erect, ca. 1 mm long; sepals minute, ca. 0.5 mm long; corolla small, ca. 4 mm long; petals white, with a pink apical spot; upper petal obtuse, not notched, its margin narrow, flat or barely curved upward; spur very short, obtuse, saccate, slightly ascending; nutlets less than 2 mm across, rounded-ovate, pointed, under magnification finely but sharply torulose-scarious. April–May.

Stony and clayey places in the semidesert zone. — European part: M. Dnp., Bl. (obviously introduced by chance); Caucasus: E. Transc. (Mugan, Apsheron), S. Transc.: Centr. Asia: Mtn. Turkm. (Great Balkhan Mountains, Kazandzhik, Ashkhabad in gardens), Pam.-Al. (western spurs, Kulyab, Shirabad valley). Gen. distr.: Centr. and Atl. Eur., Med., Bal. - 715 As. Min., Iran. Described from France. Type in Paris.

Note. This species is rare in the USSR; the numerous specimens variously referred to it, for example, from Karabakh (N. Popov, 1911, No. 823; N. Vvedenskii, 1911, No. 212) and Mangyshlak (Dubianskii), represent transitional forms between *F. parviflora* and *F. vaillantii*. To such forms of hybrid origin one must refer *F. indica* Pugsley, l.c., 313, which is very similar to *F. vaillantii*, and, like it, has a pink corolla and spherical nutlets but peduncles shorter than the bracts and the distal margin of the petal more or less curved upward. *F. indica* occurs in southern Tadzhikistan and Turkmenia, as well as in India.

10. ***F. vaillantii*** Loisl, in Desvaux, Journ. Bot. II (1809) 358; Hammar, l.c., 14; Hausskn. in Flora LVI, 441; Pugsley, l.c., 315, No. 43; Ldb., Fl. Ross. I, 105; Boiss., Fl. Or. I, 105; N. Busch in Fl. cauc. crit. III, 4, 66; Shmal'g., Fl. I, 43. — *F. schrammii* Pugsley, l.c., (1919) 319. — Ic.: Rchb., Lc. Fl. Germ. III, tab. 1, fig. 4452. — Exs.: Schultz, Herb. norm. No. 414.

Annual; stem 5–20 cm, usually branching from base with spreading branches, rarely few-branched, erect, indistinctly sulcate-faceted; lobules tripinnatisect, linear or filiform. Racemes on short, stoutish peduncles, few-flowered, in flower dense, not overtopping leaves, elongating in fruit; peduncles stoutish, short, ca. 2 mm long; bracts nearly equal or two-thirds the length of the peduncles; sepals very small, ca. 0.5 mm, in any case less than 1 mm long, acute, barely dentate, narrower than corolla, caducous; corolla pink-violet, rather stout, 5–6 mm long; upper petal with green keel and broad, flat or barely involute margins, sharply notched; lower petal broad distally, rounded or slightly notched; nutlets flattened; distinctly keeled, or spherical, quite obtuse, with inconspicuous style, ca. 2 mm across, under magnification conspicuously torulose-scabrous. April–July. (Plate XLV, Figure 9).

Fields, fallows, gardens, and weed-infested places among dwellings. – European part: U. Dnp., M. Dnp., Bl., V. -Don, L. V., Transv., Crim., L. Don; Caucasus: all regions; Centr. Asia: all regions. **Gen. distr.:** Ind.-Him., Iran., Arm.-Kurd., Bal.-As. Min., Med., Atl. and Centr. Eur., Scand. Described from France.

*11. **F. asepala** Boiss., Fl. Or I (1867) 135; Hausskn. in Flora LVI, 461; Pugsley, l. c., 321, No. 45.

Annual; stem 10–15 cm high, branching from base, branches divaricate; leaves 3-sect, with linear, flat, acute lobules. Racemes sessile, few-flowered, crowded, slightly elongating in fruit; bracts as long as or longer than the short, stout, erect peduncles, 1–1.5 mm long; sepals none; corolla (–4) 5–6 mm long, white, rather stout, outer petal flat, white, without apical pink spot with flat, broad margins and broad notch; inner petals with dark violet spot at apex; nutlets small, 1.5–1.8 mm across, rounded-ovate, slightly flattened, weakly keeled, with short mucro – the finely punctate-torulose remnant of the style. May–June.

Stony slopes. – Not yet found in the USSR, but encountered in adjacent parts of Turkey (Ardanuc, Kagyzman district). **Gen. distr.:** Iran., E. Med., Bal.-As. Min. Described from Iran. Type in Geneva.

Note. *F. asepala*, recorded for Zeravshan, does not occur there and the specimens cited are *F. vaillantii*. Yet it is possible that it may be found in the mountainous part of Turkmenistan.

Genus 561. **FUMARIOLA** * KORSH.

Korsh. in Bull. Acad. Sc. Petersb. ser. 5, IX (1898) 403

Sepals 2, small, squamiform; corolla small (3 mm long), yellow; outer petals flattish, broad, the lower obovate, the upper slightly more narrowly obovate, with saccate basal protuberance but without spur, their margins broad, flat, rounded; inner petals shorter and narrower, distally winged-keeled beneath; stamens usually 2, 3; ovary oblong, with one ovule; style

* Diminutive of *Fumaria*.

deciduous; stigma obovate, denticulate at both sides; nutlet 1-seeded, linear-oblong, clavate-cylindrical, slightly flattened parallel to the outer petal, acutely keeled, truncate, with 4 teeth, surrounding the punctiform base of the style. Annual, slightly glabrous and glaucous plant, with racemiform, umbelliform inflorescence and long-pediceled flowers. Inflorescence and parts of flowers similar to *Rupicapnos* Pomel (*Fumaria* sect. *Pterocapnos*), but in the latter species the petals with a short spur and the nutlets usually beaked, not truncate.

1. *F. turkestanica* Korsh., l.c. (1898) 404. — Ic.: Korsh. l.c., tab. 1, f. 1-4.

Annual; stem weak, 6-10 cm high, branching from base, filiform, with divaricate branches; leaves with long filiform petioles, twice ternate; segments long-petioluled, lobes sessile, spreading, oboblong, obtuse, entire or 2-3-lobulate or dissected into linear lobules. Inflorescence racemiform, reduced, subumbelliform, few-flowered (2-10), opposite the leaves, on rather long (1-2 cm) peduncles, but shorter than leaves; flowers on very long, slender pedicels (2-2.5 cm); bracts very small, squamiform; nutlet ca. 3 mm long, slightly less than 1 mm broad, becoming black when ripe, barely scabrous, three to four times as long as broad. June.

In crevices of limestone rocks. — Centr. Asia: Pam. - Al. (Alay Range, Isfairam River Gorge, Lyangar Gorge, Argylyk Mountains, Yangi-Sai Gorge, Aushir River valley between Vuadil and Shakhimardan, Kul-Kutban Lake. Endemic. Described from Lyangar. Type in Leningrad.

DIAGNOSES PLANTARUM NOVARUM IN TOMO VII FLORAE URSS COMMEMORATARUM

DIAGNOSES OF NEW SPECIES MENTIONED IN VOLUME VII

Junio 1937

CERATOPHYLLUM L.

721

1. *C. Kossinskyi* Kuzen. sp. nova.

Caulis tenuis, laevis, vix ramosus; folia in verticillis sena-octona, saturate viridia 3—4 cm longa, dichotome 2—5 dissecta, lobis filiformibus rarius lineari-filiformibus tenuissimis, denticulis parvis raris marginibus munitis. Fructus oblongo-ovales, ad 4 mm longi et 2.5 mm lati margine anguste alati, facies fructus non laevis, tuberculis parvis oblongis vel squamiformibus, interdum tuberculo uno majusculo prominente comitata, aculei tres, longitudinem fructus non superantes, basi vix dilatati, plani, superior 1.5—2.5 mm longus, inferiores 1.5—3.5 mm longi, late distantes.

Hab.: In aquis stagnantibus vel lente currentibus.

Typus: In delta fl. Rha, prope pag. Kiligi, leg. Kossinsky; in Herb. Ac. Sc. URSS conservatur.

2. *C. Komarovii* Kuzen. sp. nova.

Perenne; caulis tenuis, glaber, vix ramosus; folia saturate-viridia in verticillis sena-octona, 15—18 mm longa, dichotome dissecta, lobis filiformibus marginibus denticulis raris munitis. Fructus oblongo-ovati, stipitati, 4—5 mm longi, aculeis tribus: supremo (6) 8—12 mm longo fructu duplo longiore, duobus basi fructus insidentibus brevioribus, basi paulo applanatis, 5—7 mm longis; facies fructus non laevis, supra dimidium tuberculo vel grumo vel aculeo brevi falcato comitata.

Hab.: In stagnis.

Typus: prov. Leningrad, in stagnis prope opp. Slutzk (Pavlovsk olim).

Affine est *C. oryzetorum* Kom., sed dorso fructus tuberculo vel grumo vel aculeo falcato (nec aculeo rigido erecto) munito sat differt.

CIMICIFUGA L.

3. *C. europaea* N. Schipcz. sp. nova.

Perennis; rhizoma crassum, multiceps; caules simplices vel in parte superiore ramosi, rotundati, vix sulcati, 1—2 m alti glaberrimi tantum in inflorescentia glanduloso-pilosi; folia caulina infima longe pedunculata pedunculis basi dilatatis, biternata, segmentis impari-pinnatis; lobi sessiles vel breviter petiolati, ovati, acuminati, pinnato-incisi vel saepe in parte inferiore pinnato-

* [This appendix has been reproduced photographically from the Russian original.]

722 secti, marginibus profunde crenati; folia suprema subsessilia vel breviter petiolata; petioli foliorum et folia ad nervos subtus pilis rectis dispersis tecti. Racemus simplex vel saepius ramosus, ramis pedicellisque breviter pilosis; bracteae lanceolatae, acutae, pedicellis breviores; sepala cito decidua, petala (staminodia) integra, superne plus minusve scariosa; stamina numerosa, ovaria 5, pubescentia, sessilia vel breviter pedicellata.

Typus: Ucraina. Dist. Kiev, ad nemorum margines prope stationem viae ferreae Bojarki. Fl. 6 VIII 1902. Leg. W. Finn. Exs. HFR n° 1552; in Herb. Ac. Sc. URSS conservatur.

Affinis est *C. foetidae* L. sed caule nudo, petiolis pilis sparsis instructis (nec glandulis minutissimis densissime tectis), bracteis lanceolato-cuneatis (nec subuliformibus), pedicellis brevioribus (nec eos subaequantibus) diversa est.

DELPHINIUM L.

4. *D. propinquum* Nevski sp. nova (§. *Elatopsis*).

15—40 cm altum, caule inferne fere glabro, pilis enumerosis brevibus vix piloso, superne dense glanduloso-pubescenti; petiolis longis, basi dilatatis, pilosis; lamina foliorum plana vel subplana, utrinque breviter pilosa, fere ad basin trisecta, segmento intermedio obcordato, in lobis 3, 3—5-dentatis fisso, lateralibus latioribus in segmentis 2 ord. cum segmento intermedio subsimilibus sectis; racemo paucifloro, pedicellis 2—4.5 cm longis breviter denseque pubescentibus et pilis longiusculis pilosis; bracteolis lineari-lanceolatis, obtuse acuminatis, 7—15 mm longis, 2—3 mm latis, pilosis; floribus coeruleis magnis; sepalis 2—3.1 cm longis, 1.3—1.8 cm latis, late obovatis, obtusis, membranaceis, dorso pilis longis flexuosis tectis, intus glabris; calcare crasso-cylindraceo 1.4—1.7 mm longo, obtuse acuminato, superne recurvo; folliculis 3, pilosis.

Typus: Asia Media, m. Karategin, ad marginem glaciei Dibarar, 10 VIII 1896, n° 1922, lg. Lipsky; in Herb. Ac. Sc. URSS conservatur.

A *D. Brunoniano* Royle differt foliis planis vel subplanis, nec in petiolum infundibuliforme attenuatis, dentibus terminalibus obtusiusculis, nec apiculatis et calcare longiore tenuioreque.

5. *D. megalanthum* Nevski sp. nova (§. *Elatopsis*). — *D. flexuosum* γ. *Paulovi* Akinf. in Trav. Soc. Nat à l'Univ. Imp. Kharkow XXVII (1894) 167. — *D. speciosum* var. *Paulovii* N. Busch in Fl. cauc. crit. III, 3 (1903) 64.

Caule 35—75 cm alto, costato, inferne leviter piloso, superne glabro; petiolis basi vix dilatatis margine ciliatis; foliis eis *D. speciosi* M. B. similibus, superne leviter pilosis vel glabris, inferne pallidioribus et ad nervos pilosis, margine ciliatis; racemo erecto, pedicellis strictis vel vix patentibus, glabris vel fere glabris; bracteolis ovato-lanceolatis vel ovatis, vulgo 7—9 mm longis

723 et 3—4 mm latis, obtuse acuminatis, glabris, rarius vix ciliatis, saepe violaceo-coloratis; floribus coeruleis, sepalis 2.2—3.3 cm longis, ad 1.6 cm latis, late ovatis glaberrimis; calcare 0.5—2.3 cm longo, superne leviter incurvo.

Typus: Caucasus septentrionalis, prope glaciem Bezengi, 25 VII 1892, lg. Lipsky; in Herb. Ac. Sc. URSS conservatur.

Ab affini *D. specioso* M. B. differt sepalis glaberrimis.

6. *D. confusum* M. Pop. sp. nova (§. *Elatopsis*). — *D. Duhmbergii* Huth in Engler, Bot. Jahrbüch. XX (1895) 402, pro parte. — *D. speciosum* Huth l. c., p. 415, pro parte, non M. B.

30—65 cm altum, caulibus dense pilosis, inferne pilis patentibus 1.5—2 mm longis tectis, superne molliter pubescentibus; petiolis longis, basi dilatatis, longe pilosis; lamina foliorum orbiculari-reniformi, utrinque dense pubescenti vel plus minusve pilosa, trisecta, segmento intermedio oblongo-obovato vel obovato, in lobis 3, 3—4 dentatis fisso, — lateralibus in segmentis 2 ord. cum segmento intermedio plus minusve similibus sectis vel fissis, racemo denso, basi interdum ramoso, multifloro; bracteis late lanceolatis vel lanceolatis, integris (rarius inferioribus trisectis), obtusiusculis, pedicello brevioribus, dense et breviter pilosis; pedicellis brevibus, 0.5—1 (1.5) cm longis pilis patentibus brevibus densissime pilosis; bracteolis late-ovatis obtusis vel obtusiusculis, 5.5—7 (9) mm longis, 3—4 (5) mm latis, pubescentibus; floribus obscure violaceis; sepalis ovatis vel obovatis, obtusis, 1—1.5 cm longis, 0.5—0.8 cm latis, dorso breviter denseque pubescentibus, intus fere glabris; calcare horizontaliter patenti, prope apicem incurvo, 1.2—1.5 cm longo, 2.5—3 mm crasso.

Typus: Asia Media, m. Akbach-tau, 12 VIII 1921, n° 8193 leg. Abolin; in Herb. Ac. Sc. URSS conservatur.

A *D. oreophilo* Huth (*D. dasyanthum* auct. Fl. As. Med. pro max. parte) differt floribus obscure violaceis, nec coeruleis vel pallide coeruleis, pedicellis brevioribus, bracteolis late ovatis, nec anguste linearibus.

7. *D. Ruprechtii* Nevski sp. nova (§. *Elatopsis*). — *D. flexuosum* var. *bracteolatum* N. Busch in Fl. cauc. crit. III, 3 (1903) 67, pro parte.

Caulibus elatis, ad 1 m altis, costatis, leviter pilosis vel fere glabris; petiolis basi non dilatatis, pilosis; foliis eis *D. flexuoso* M. B. subsimilibus, supra vix pubescentibus, subtus ad nervos pilosis, fere ad basin palmatisectis, segmento intermedio oblongo-rhomboideo in lobis 3, 3—5-dentatis fisso, latoribus cum segmento intermedio subsimilibus; racemo denso vulgo non ramoso, rachide glabra; bracteis lanceolatis margine plus minusve ciliatis; pedicellis glabris erecto-patentibus; bracteolis ellipticis vel elliptico-ovatis, 5.5—8 mm longis, 4—4.75 mm latis, obtusiusculis, violaceo-coloratis, glaberrimis, sepalis ovatis vel elliptico-lanceolatis, 1.5—2 cm longis, ad 1.2 cm latis, obtusis, dorso glabris, intus ciliolatis, margine ciliis numerosioribus donatis; calcare 1.5 (2) cm longo.

Typus: Caucasus, Daghestania, inter pagos Czirch et Rhyeza, lg. Ruprecht; in Herb. Ac. Sc. URSS conservatur.

Differt a *D. flexuoso* M. B. et *D. bracteoso* Somm. et Lev. bracteolis ellipticis vel elliptico-ovatis glaberrimis.

8. *D. ochotense* Nevski sp. nova (§. *Elatopsis*).—*D. elatum* a. *subglabrum* Regel et Tiling in Nouv. Mém. Soc. Imp. Nat. Mosc. XI (1859) 39.

25—50 cm altum, caulibus molliter et breviter pubescentibus, superne vix glandulosis, dense foliosis; foliis orbiculari-cordatis vel orbiculari-reniformibus, leviter pubescentibus, palmatisectis, lobis vulgo biternatim fissis dentibus terminalibus obtusis vel obtusiusculis late ellipticis vel lanceolatis; racemo multifloro, rachide pedicellisque dense et molliter pubescentibus; bracteolis linearibus 4—6 mm longis; floribus coeruleis; sepalis ovatis vel ovato-lanceolatis, obtusis (1.3) 1.5—2(2.2) cm longis, 5—9 mm latis dorso marginibusque leviter patentim pilosis; calcare horizontaliter patenti, fere recto vel sub apice plus minusve incurvo, 1.2—1.8 cm longo.

Typus: Sibiria extremi-orientalis, prope Ajan, legit Tiling; in Herb. Ac. Sc. URSS conservatur.

Differt a *D. elato* L. pubescentia et foliorum forma.

9. *D. cryophilum* Nevski sp. nova (§. *Elatopsis*).—*D. elatum* var. *intermedium* f. *hirsuta* Pohle in herb.

Caule 20—65 cm alto, setoso-piloso, pilis retroversis, 1.5—2.75 mm longis inferne numerosioribus brevioribusque donato; foliis (praesertim inferne) setoso-pilosis; lamina foliorum orbiculari-cordata, palmatisecta lobis plus minusve rhomboideis vulgo biternatim fissis; racemo erecto densiusculo, ad 20 cm longo, multifloro, floribus violaceo-coeruleis; pedicellis 1—4 cm longis patentim pilosiusculis pilis enumerosis, 2—2.5 mm longis donatis; bracteolis lineari-subulatis, ca. 5 mm longis, 0.5 mm latis; sepalis fere glabris, dorso sub apice vix setuloso-pilosis, ovatis, 1.2—1.5 cm longis, 0.4—0.65 cm latis, obtusis; calcare 1.3—1.4 cm longo.

Typus: In decliviis argillosis herbosis insulae Kolgujev, lg. Pohle, 23 VIII 1902; in Herb. Ac. Sc. URSS conservatur.

Differt a *D. elato* L. statura humiliore, caulibus setoso-pilosis, floribus violaceo-coeruleis.

10. *D. Korshinskyanum* Nevski sp. nova (§. *Elatopsis*).—*D. elatum* Korsh. in A. H. P. XII, p. 299, non L.

Caule 55—125 cm alto, basi ad 8 mm crasso, violaceo-punctato, fere tota longitudine patentim setoso-piloso, pilis albis 2.5—3 mm longis, superne sub racemo glabro; petiolis setoso-pilosis, basi leviter dilatatis; lamina foliorum orbiculari-cordata, supra adpresse pilosa, subtus praesertim ad nervos setoso-pilosa biternatim secta lobis terminalibus 2—3 dentatis; racemo erecto, multifloro, interdum ramoso floribus coeruleis; bracteis linearibus, margine

725 plus minusve ciliatis, pedicello glabro brevioribus; bracteolis linearibus vel lineari-lanceolatis, saepe coloratis, acuminatis, margine ciliatis rarius glabris, 4.5—5 mm longis, 0.75 mm latis; sepalis ovatis, 1.1—1.4 cm longis, 0.4—0.7 cm latis, obtusis, utrinque glabris, marginibus ciliatis; calcare glabro vel leviter piloso, 1.3—1.5 cm longo, horizontaliter patenti, sub apice incurvo; folliculis glabris, 1.3—1.4 cm longis.

Typus: Inter fl. Zeja et Bureja, prope pagum Ivanovskoje, in pratis, 11 VII 1891 lg. Korshinsky; in Herb. Ac. Sc. URSS conservatur.

A *D. retropiloso* Sambuk differt: caule praesertim inferne folioso et foliis basi cordatis, nec cuneatis.

11. **D. uralense** Nevski sp. nova (§. *Kolobopetala*). — *D. dictyocarpum* v. *canescens* Korsh. Tent. fl. Ross. or. (1898) 18.

Tota planta velutino-tomentella; caulibus 55—110 cm altis, inferne costatis; lamina foliorum orbiculari-cordata vel orbiculari-reniformi, 3.5—7 cm longa, 5.5—12 cm lata, palmatisecta, lobis vulgo ternatim fissis lobulis terminalibus 2—3 dentatis; racemo inferne interdum ramoso, denso, multifloro, floribus laete coeruleis; bracteolis lineari-subulatis, 3.5—6 mm longis, 0.5 mm latis, dense adpresse pilosis; sepalis ovatis, obtusis, dorso tomentellis, 1—1.6 cm longis, 0.5—0.9 cm latis; calcare cylindraceo, 1.2 cm longo, 2—2.5 mm crasso, obtuse acuminato; folliculis 3 densissime pubescentibus.

Typus: Prov. Orenburg, prope pagum Andreevka, lg. D. Litwinow, 5 VII 1893; in Herb. Ac. Sc. URSS conservatur.

Differt a *D. dictyocarpo* DC. indumento.

12. **D. cyananthum** Nevski sp. nova (§. *Kolobopetala*). — *D. dictyocarpum* var. *pubiflorum* Trautv. in Bull. Soc. Nat. Mosc. XXXIII, I (1860) 81.

Caulibus 75—100 cm altis, glabris, solummodo sub racemo interdum leviter pilosis; petiolis glabris marginibus ciliatis; foliis eis *D. dictyocarpi* DC similibus, orbiculari-cordatis, fere ad basin palmatisectis lobis rhomboides vulgo biternatim fissis, supra glabris, subtus ad nervos pubescentibus, margine ciliato-pilosis; racemo ramoso, denso, multifloro, floribus laete coeruleis; pedicellis brevibus (vulgo ca. 1 cm longis), adpresse et dense pilosis; bracteolis lineari-subulatis vel interdum fere lineari-lanceolatis, dense pilosis, brevibus, 1.5—5 mm longis, 0.5—1 mm latis; sepalis dorso tomentellis, ovatis, obtusis, 1—1.1 cm longis, 0.4—0.8 cm latis; calcare 1.1—1.3 cm longo ad 3 mm crasso; folliculis 3, dense pubescentibus.

Typus: Songoria, fl. Tentek, lg. Schrenk; in Herb. Ac. Sc. URSS conservatur.

Ab affini *D. dictyocarpo* DC. differt pedicellis, bracteolis et sepalis pubescentibus.

13. **D. aemulans** Nevski sp. nova (§. *Kolobopetala*).

Caulibus 80—100 cm altis, basi ad 8 mm crassis, leviter costatis, inferne pilis retroversis albis pilosis et violaceo-coloratis, sub racemo dense glandu-

726 loso-pubescentibus; foliis eis *D. dictyocarpi* DC. similibus, glabris, orbiculari-reniformibus, basi truncatis vel vix cuneatis, fere ad basin palmatisectis lobis lineari-rhomboides pinnatifidis; racemo inferne ramoso, denso, multifloro, rachide dense glanduloso-pubescenti; pedicellis erecto-patentibus 1—2 cm longis, glandulosis; bracteolis lineari-filiformibus glanduloso-pubescentibus, 6—10 mm longis, 0.5 mm latis; floribus obscure coeruleis; sepalis ovatis, obtusis, ca. 1 cm longis, ad 0.75 cm latis, dorso patentim glanduloso-pilosiusculis; calcare 1.2—1.3 cm longo, 1.5—1.75 mm crasso, apice obtuse acuminato et incurvo; folliculis 3, densissime glanduloso-pubescentibus.

Typus: Songoria, in montibus Monrak prope urbem Zaissan, 22 VII 1930, n° 735, lg. Gontscharov et Borissova; in Herb. Ac. Sc. URSS conservatur.

Ab affini *D. dictyocarpo* DC. differt pubescentia glandulosa.

14. *D. altaicum* Nevski sp. nova (§. *Kolobopetala*).

80—100 cm altum; caulibus basi leviter violaceo-coloratis et breviter adpresse pilosis, superne leviter pubescentibus; foliis supra glabris vel subglabris, subtus ad nervos breviter pubescentibus, orbiculari-cordatis vel orbiculari-reniformibus, basi interdum vix cuneatis, fere ad basin palmatisectis lobis 5—7 rhomboides inaequaliter pinnatifidis; racemo densiusculo, rachide patentim breviter denseque pilosa; pedicellis erecto-patentibus, 1—2 cm longis, dense pubescentibus; bracteolis lineari-filiformibus, 4—7 mm longis, 0.5 mm latis, dense glanduloso-pubescentibus; floribus obscure coeruleis; sepalis dorso plus minusve glanduloso-pubescentibus, ovatis vel elliptico-ovatis, obtusis, 1.2—1.3 cm longis, ad 0.75 cm latis; calcare 1.5—1.9 cm longo, ad 2.5 mm crasso, apice obtuse acuminato, sub apice incurvo; folliculis 3, dense glanduloso-pilosis.

Typus: Prope lacum Marka-kul, lg. B. Keller, 4 VIII 1908; in Herb. Ac. Sc. URSS conservatur.

Differt a *D. aemulanti* Nevski foliis subtus ad nervos pubescentibus.

15. *D. semiclavatum* Nevski sp. nova (§. *Diedropetala*).

55—75 cm altum; caule leviter ramoso, ramis longis virgatis, inferne dense glanduloso-pubescenti, praesertim basi folioso; petiolis basi dilatatis; lamina foliorum semiorbiculari, fere glabra, ad basin tripartita, segmentis sessilibus: intermedio obovato, basi cuneato, apice in lobis 3—5 rotundatis obtusis leviter fisso, lateralibus latioribus, ad medium in segmentis 2 ord. margine inaequaliter lobatis sectis; racemo laxo, paucifloro, longo; pedicellis glabris, ad 1.5—1.7 cm longis; bracteis anguste lineari-lanceolatis, glabris, minutis; bracteolis 1.5—2 mm longis, subulato-linearibus, supra medium pedicellorum insertis; floribus sordide lilacinis; sepalis glabris, obtusis, 0.95—1 cm longis, 0.45 cm latis; calcare recto vel fere recto, obtuso, sub apice gibboso, 1—1.2 cm longo, ad 2.75 mm crasso; staminodiis fere glabris; folliculis glabris, 0.8 cm longis.

727 Typus: Asia media, Pamiro-Alaj occidentalis, Sangardak 20 VI 1896, n° 1887, lg. Lipsky; in Herb. Ac. Sc. URSS conservatur.

Differt a *D. saniculaefolio* Boiss. floribus sordido-lilacinis, nec coerulescentibus, calcare longiore, staminodiis fere glabris et pedicellis brevioribus.

16. *D. inopinatum* Nevski sp. nova (§. *Diedropetala*).

Caule 75—85 cm alto, fere tota longitudine aureo glanduloso-tomentello; petiolis basi valde dilatatis, longis, dense pubescentibus; lamina foliorum ternatim partita, segmentis 1 ord. breviter petiolulatis, in laciniis terminalibus anguste-linearibus (1.25—2.5 mm latis) dense pubescentibus bi-triternatim sectis; racemo 25—35 cm longo, densiusculo, rachide sparsim pilosa; bracteis minutis, 2.5 mm longis, pedicello multo brevioribus, linearibus, glabris vel ciliolatis; pedicellis brevibus, ad 1.7 cm longis, glabris; bracteolis linearisubulatis, supra medium pedicellorum insertis; floribus pallidis, sordide coerulescenti-lilacinis; sepalis 0.8—0.9 cm longis, 0.35—0.4 cm latis, oblongo-obovatis, obtusis, glabris, margine albo-membranaceis; calcare recto vel fere recto, glabro, 1—1.1 mm longo, 2—2.5 mm crasso; staminodiis barbatis; folliculis 1.2—1.5 cm longis.

Typus: Asia Media, in montibus Ak-tau, 19 V 1932 n° 119, lg. Russanov; in Herb. Ac. Sc. URSS conservatur.

Differt a *D. bucharico* M. Pop. indumento.

17. *D. Pallasii* Nevski sp. nova (§. *Diedropetala*). — *D. tauricum* Pallas, Ind. taur. in Neueste Nordische Beiträge III (1796) 432, nomen nudum. — *D. hybridum* ββ. Ldb. Fl. Ross. I (1842) 61. — *D. rossicum* Rouy, Fl. Fr. I (1893) 134, in adnot. pro parte.

Caule 35—115 cm alto, inferne piloso, superne dense glanduloso-pubescenti; petiolis basi valde dilatatis, ad 10—20 cm longis; lamina foliorum tripartita, segmentis petiolulatis in laciniis terminalibus anguste-linearibus bi-triternatim sectis; racemo erecto, denso, 12—30 cm longo, multifloro; bracteis linearibus, rarius inferioribus bi-tripartitis, pedicello vulgo duplo brevioribus dense pubescentibus; bracteolis linearisubulatis, 3—5 mm longis; floribus lilacinis; sepalis obtusis, 1—1.3 cm longis, 0.5—0.65 cm latis, dorso adpresse denseque pubescentibus; calcare leviter incurvo, 1.65—2 cm longo, ad 3—4 mm crasso; folliculis breviter pubescentibus.

Typus: Tauria. Herb. Pallas; in Herb. Ac. Sc. URSS conservatur.

Ab affini *D. fisso* W. et K. differt sepalis dorso adpresse, nec patentim pubescentibus.

ACONITUM L.

18. *A. ajanense* Steinb. sp. nova. — *A. Lycoctonum* var. *cynoctonum* Trautv. et Mey. in Middend. Reise I, 2 (1856) 12.

Perenne; caulis ca. 60 cm altus, simplex vel in inflorescentia paucirameus, infra glaber, supra cum pedunculis pilis crispulis flavescentibus vesti-

tus; folia radicalia et caulina inferiora longepetiolata ad basin caulis congesta; petioli usque ad 20 cm longi pilis erectis paucis obsiti vel glabri; lamina foliorum tenuia, supra viridia et glabra, ad nervos parce pilosa, infra pallida, glaberrima, margine ciliata, forma foliorum *Aconitum ranunculoides* Turcz. referens. Racemus terminalis laxiflorus; flores majores sulphurei; pedicelli flores aequantes v. eis breviores, bibracteolati; cassis late claviformis, rostro valde producto, pilis erectis vel crispulis vestita, 1.7—2.3 cm alta, ca. 0.7 cm lata, linea basali ca. 1.5 cm longa; sepala lateralia ovato-rotundata, 0.8 cm longa, 0.7—0.9 cm lata, extus glabra, intus barbata, margine longeciliata; sepala inferiora inaequalia, 0.7—1 cm longa, 0.2—0.3 et 0.4—0.5 cm lata, extus pilosa, intus plus minusve dense barbata; nectaria calcare semicirculari-spirali, stipite rectiusculo, labio rotundato; stamina filamentis glabris uni-vel bidentatis. Carpella 3 glabra vel rarius pilosa.

Hab.: In silvis ripariis.

Typus: Oriens Extremus. Ad ripam maris Ochotensis ad sinum Ajan. 7 VIII 1916; in Herb. Ac. Sc. URSS conservatur.

Nostra species *A. ranunculoidi* Turcz. valde affinis, sed floribus majoribus, cassis forma et calcare nectarii bene differt.

19. *A. Sukaczewii* Steinb. sp. nova.

Perenne; caulis erectus 40—45 cm altus cum inflorescentia molliter patentim villosus; folia radicalia 1—2, longepetiolata; petioli 15—20 cm longi, patentim pilosi; lamina ambitu quinquangularis, usque ad 4—7 cm longa et 8—10 cm lata, late palmato-partita, partitiones versus apicem trilobatae, lobi rotundato-acuminati glanduliferi; lamina supra adpresse et breviter pilosa, infra ad nervos pilis longis rectis vestita, margine ciliata. Racemus terminalis simplex, laxiflorus; flores viridi-flavescentes; pedicelli 3—5 mm lg. bibracteolati, bracteae et bracteolae usque ad 1 cm longae lineares pilosae ad basin floris insertae; cassis late conico-cylindracea, valde rostrata, erecto-vel subpatentim pilosa, 1—1.5 cm alta, parte media 0.4—0.5 cm lata, linea basali 1.0—1.4 cm lg.; sepala lateralia oblonga 1—1.2 cm longa, 0.8—0.9 cm lata, extus glabra, tantum in linea mediana pilosa, intus barbata; sepala inferiora inaequalia, ca. 1 cm longa et ca. 3 et 6 mm lata, extus pilosa, intus plus minusve barbata, margine ciliata; nectaria stipite recto, calcare fere erecto (non adunco), vix incrassato; stamina 10—14, filamentis glabris basi dilatatis. Carpella 3, glabra.

Hab.: In cembretis mucosis.

Typus: Sibiria baicalensis. Ad lacum Baical in angustiis Uluntui prope stationem viae ferreae Sljudjanka; in Herb. Ac. Sc. URSS conservatur.

Ab omnibus speciebus sibiricis sectionis [*Lycotoni* habitu alieno, bracteolis bracteisque longis et pubescentia valde differt.

20. *A. crassifolium* Steinb. sp. nova.

Perenne; caulis ca. 70 cm altus, erectus, simplex, parte inferiore sparse, in inflorescentia pilis crispulis flavescentibus dense pubescens; folia radicalia

729 4—5 longepetiolata; petioli 5—15 cm longi, pilis longis sparsis obsiti; lamina ambitu orbiculari-quinquangularis, 6—10 cm lata, 4—6 cm longa, profunde et late palmato-partita, partitiones tridentatae, dentes laterales bi-, mediani tridenticulati, obtusi, glanduliferi; sinus foliorum apertus; folia supra pilis adpressis rectis pilosa, infra praesertim ad nervos et margine ciliata. Racemus terminalis pauciflorus, parte inferiore saepe ramosus, ramis longis arcuato-adscententibus; flores flavi; pedicelli florem aequantes vel eo multo breviores, ad medium vel infra medium lineari-bracteolati; cassis conico-cylindracea, valde rostrata, pilis crispulis flavescentibus longis rarius brevibus rectisque vestita, 1.8—2.5 cm longa, 0.5—0.8 lata, linea basali 1.2—1.5 cm longa; sepala lateralia rotundata, 0.7—0.9 cm longa et lata, extus glabra, tantum linea mediana pilis brevibus vestita, intus barbata, margine eciliata vel paulo ciliata; inferiora inaequalia, 0.7—0.9 cm longa et ca. 0.2 et 0.4 cm lata, extus pubescentia, intus plus minusve barbata, margine ciliata; nectaria calcare spiraliter ut in *A. umbroso* (Korsh.) Kom. rarius semispiraliter contorto; stamina filamentis a medio dilatatis, bidentatis vel edentulis. Carpella 3, plus minusve pubescentia.

Hab.: Ad vias et in collucatis silvarum coniferarum.

Typus: Oriens Extremus. Sinus „Sovetskaja“ 18 VII 1916 N. P. Krylov; in Herb. Ac. Sc. URSS conservatur.

Appropinquat ad *A. umbrosum* (Korsh.) Kom., sed foliis crassis et floribus colore diversum est.

21. **A. Krylovii** Steinb. sp. nova. — *A. ochranthum* C. A. M. in Ldb. Fl. Alt. II (1830) 285, pro parte. — *A. Lycoctonum* Kryl. Фл. Зап. Сиб. V (1931) 1153, non L.

Perenne; radix fibrillis nigris vestita; caulis 50—130 cm altus, simplex, angulatus, foliosus, parte inferiore cum petiolis longe patentim pilosus, parte superiore pilis brevibus patentibus flavescentibus dense obsitus; folia radicalia 12—20 cm lata, 6—10 cm longa, ambitu orbiculari-reniformia, 3—5 rarius 7-palmatopartita, partitiones latae, parce incisae, margine ciliatae; folia supra atrovirentia, pilis adpressis albis vel flavis vestita, infra griseo-viridia, ad nervos longepilosa. Racemus terminalis parte inferiore interdum ramosus; flores intense lutei; cassis cylindracea, 1.2—2.0 cm alta, 0.3—0.4 cm lata, linea basali 1.0—1.2 cm longa, extus pilis flavis rectis obsita; sepala lateralia obovato-rotundata vel leviter asymmetrica 0.9—1 cm longa, 0.8—0.9 cm lata, extus dorso pilosa, intus barbata; sepala inferiora subinaequalia, 0.8—0.9 cm longa, 0.4—0.5 cm lata, extus dorso pilosa, intus plus minusve barbata; nectaria calcare longo et recto deorsum spectante, fere non curvato, 3—3.5 mm longo; stamina glabra filamentis a medio dilatatis, interdum bi-vel unidentata. Carpella 3 glabra.

Hab.: In silvis montanis collucatis, in decliviis graminosis et pratis silvaticis.

Typus: Sibiria occidentalis. Vallis fluv. Kujum, ad ostium rivi Korocza Inferior in declivio meridionali graminoso. 17 VII 1915. P. N. Krylov; in Herb. Ac. Sc. URSS conservatur.

Valde affine *A lasiostomo* Rchb., sed pubescentia patente (nec crispula) et carpellis glabris (nec pubescentibus) sat differt.

22. *A. monticola* Steinb. sp. nova.

Perenne; caulis usque ad 1.5 m altus, erectus, ad basin ca. 0.8 cm latus, obsolete angulatus, inferne glaber vel pilis adpressis parvis falciformibus vestitus, in inflorescentia pilis rectis flavescentibus patentim pilosus; folia radicalia et caulina inferiora longepetiolata; petioli usque ad 20 cm longi, costati, adpresse minute pilosi; lamina ambitu orbicularis, usque ad 10 cm longa, et 20 cm lata, profunde palmatim 5—7-partita; partitiones late cuneatae, 3-fidae, lobis acutis, folia supra glabra, infra ad nervos vel rarius ad laminam pilis crispulis vestita; margine minute ciliata. Racemus 40—45 cm longus, superne densus, multiflorus, inferne ramosus; flores flavi; pedicelli flores aequantes, vel eis multo breviores longioresve; cassis latecylindracea, 1.0—1.5 cm alta, ad medium 0.5—0.6 cm lata, linea basali 1.3—1.5 cm longa, rostro valde producto; sepala lateralia obovata vel ovata, 1—1.2 cm longa, 0.7—0.8 cm lata, extus glabra sed linea mediana pubescentia, intus glabra vel paullo barbata, eciliata; sepala lateralia subinaequalia ca. 1 cm longa, 0.4—0.5 cm lata, extus pubescentia, intus glabra, margine sparse ciliata; nectaria calcare brevi (ad 2 mm longo) recto, non curvato; stamina glabra filamentis a medio abrupte dilatatis, uni- vel bidentatis, vel edentulis. Carpella 3, glabra.

Hab.: In vallibus fluviorum ad limitem superiorem silvarum.

Typus: Asia Media. Alatau Soongoricus, in promontoriis meridionem versus a Lepsinsk. 14 VI 1909. R. Roshevitz; in Herb. Ac. Sc. URSS conservatur.

Ab omnibus speciebus seriei *Longicassidati* lamina foliorum supra glabra dignoscitur.

23. *A. Flerovii* Steinb. sp. nova. — *A. Napellus* γ. *paniculatum* Rgl. us. f. *mosquense* Rgl. in Bull. Soc. Nat. Mosc. XXXIV 3 (1861) 107.

Perenne; radix biennis; caulis usque ad 1 m altus, tantum in inflorescentia ramosus, aequaliter foliosus, glaber; folia petiolata, glaberrima; lamina foliorum ambitu orbiculata, 5—8 cm longa, 6—10 cm lata, pedato 3-fida, segmentum medianum foliorum inferiorum subpetiolulatum; segmenta secundaria 0.5—0.7 cm lata obtuso-laciniata. Racemus terminalis laxiflorus, bractee florum inferiorum majusculae foliis similes trilobatae; flores intense violacei; cassis sub anthesi hians glabra, 1.8—2 cm longa, 0.8—1.1 cm alta, in parte superiore 1.0—1.2 cm lata; sepala lateralia leviter asymmetrica 1.2—1.5 cm longa, 1.0—1.2 cm lata, extus glabra, intus barbata, margine ciliolata; nectaria stipite apice paulo incurvo, calcare usque ad 0.2 cm longo leviter adunco,

731 cuculli usque ad 0.2 cm lati, labio in apice latiore exciso; filamenta glabra basi dilatata 1—2-dentata vel edentula. Carpella 3 glabra.

Hab.: In paludibus et silvis paludosis.

Typus: Rossia europaea media. Prov. Vladimir (olim). Prope pag. Eltzy in alneto caenoso ad marginem paludis turfosae Veredischino, n° 1003. 1 VIII 1913. M. I. Nasarov; in Herb. Ac. Sc. URSS conservatur.

Ab omnibus speciebus seriei *Ambigua* bracteis inferioribus latis trilobatis bene differt.

24. **A. Smirnovii** (Sukacz.) Steinb. sp. nova — *A. Napellus* var. *Smirnovii* Sukacz. in sched. ad Herb. Inst. Bot. Ac. Sc. URSS.

Perenne; radix biennis obovato-fusiformis 2—3.5 cm longa, usque ad 1.5 cm lata; caulis erectus, strictus, simplex 25—45 cm altus, inferne glaber, in inflorescentia pedunculisque pilis brevibus mollibus patentim vestitus, in parte superiore dense foliatus, folia caulina superiora brevipetiolata, adpressa, inferiora sub anthesi emarcida, longepetiolata, petioli 5—8 cm longi; lamina foliorum 5—6 cm longa, 6—9 cm lata, glabra, supra ad nervos pilis brevibus obsita, parce ciliata, ambitu orbiculata profunde palmatim 5—7-secta; segmenta primaria e basi cuneata 0.4—0.6 cm lata bi-trifida; segmenta secundaria lanceolato-laciniata, laciniis 0.2—0.5 cm latis, acuminatis vel acutis. Racemus terminalis 3—7 cm longus, densus (racemus laxiflorus — var. *jenisseense* Steinb.), pedunculi 2—4-plo flore breviores; flores mediocres, intense violacei (in sicco); cassis hemisphaerica vel subnavicularis 1.5—2 cm longa, usque ad 1—2 cm alta, in parte superiore usque ad 1.5 cm lata post anthesin nonnihil hians; sepala lateraliter leviter asymmetrica 1.2—2 cm longa et lata, extus et intus glabra, parce ciliata; sepala inferiora inaequalia usque ad 1.5 cm longa, 2—3 et 0.5—0.7 cm lata, etiam extus et intus glabra, parce ciliata; nectaria curvata, stipite cucullo 3—4-plo longiore, calcare capitato, 1—1.5 mm in diametro; cucullus vix inflatus 2.5—3 mm latus labio paululum exciso, filamenta glabra bidentata, pars filamentorum dilatata partem superiorem superans. Carpella 3 (rarius 4) glabra.

Hab.: In cacuminibus ad limitem superiorem silvae e laricibus et cedris sibiricis solitariis in pratis paludosis.

Typus: Dauria. In systemate fl. Onon, ad fontes fl. Kumyl. In planitie excelsa lapidosa jugi Kumyl. 29 VII 1913. V. Smirnov; in Herb. Ac. Sc. URSS conservatur.

25. **A. altaicum** Steinb. sp. nova. — *A. Napellus* var. *alpinum* Rgl. in Ind. sem. Horti Petrop. (1861) 45, pro parte; Rgl. in Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 103 pro parte; Крыл. Фл. Зап. Сиб. V, 1149.

Perenne; radix biennis ovato-fusiformis vel fusiformis, usque ad 2 cm et ultra longa, 1 cm lata; caulis erectus, simplex, cylindricus, inferne glaber, superne cum pedunculis breviter puberulus, aequaliter foliatus; folia brevipetiolata; lamina foliorum ambitu quinquangularis usque ad basin trisecta,

732 segmento mediano e basi cuneato, trilobato, lobis incis, laciniis obtusiusculis vel acuminatis segmentis lateralibus profunde bipartitis etiam bi-trilobatis, lobis laciniisque obtusiusculis vel acuminatis; lamina supra viridis, subtus pallida, glabra, margine leviter revoluta. Racemus terminalis brevis, simplex, usque ad 15 cm longus; flores intense violacei, 2—3 cm longi, usque ad 1.5 cm lati; cassis ca. 1.7 cm longus et 0.8 cm altus in parte superiore 1—1.5 cm latus sub anthesi hians, hemisphaericus superne rotundatus, glaber, ad rostrum ciliatus; sepala lateralia rotundata ca. 1.3 cm in diametro, extus glabra intus barbata margine ciliata; sepala inferiora inaequalia, usque ad 1 cm longa et 0.3—0.5 cm lata; minus extus pubescens, intus glabrum, majus extus pubescens, intus barbatum, ambo ciliata; nectaria stipite valde curvato, calcare usque ad 1 mm in diametro capitato, cuculli usque ad 2 mm lati, labio majore obcordato exciso; filamenta glabra supra medium sensim dilatata. Carpella 3 glabra vel paulo pilosa.

Hab.: In zona subalpina ad ripas, in clivis non arduis, in pratis.

Typus: Sibiria occidentalis. Oirotia. Ad fontes rivi Atryk, confluvii flum. Kuba, in rupestribus saxosisque. 21 VII 1915. P. Krylov; in Herb. Ac. Sc. URSS conservatur.

26. **A. baicalense** Turcz. pl. exs. nomen. — *A. Napellus* α ., β ., γ ., Turcz. Fl. baic.-dah. I (1842) 80. — *A. Napellus* γ . *paniculatum* lusus c. *baicalense* Rgl. in Ind. sem. Hort. Petrop. (1861) 45; Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 106. — *A. Napellus* δ . *racemosum* Rgl. lusus b. *mongolicum* Rgl. in Ind. sem. Hort. Petrop. (1861) 46; Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 108. — *A. Napellus* var. *mongolicum* (Rgl.) Sukacz. in sched.

Perenne; radix biennis fusiformis 2—5 cm longa, usque ad 1.3 cm lata non raro fibrillis nigris obsita; caulis 70—100 cm altus simplex vel in inflorescentia ramosus, in parte media saepe dense foliatus, glaber, vel in inflorescentia pilis crispulis plus minusve pilosus (var. *commune* Turcz. in schedis); interdum caulis tantum ad 40 cm altus, tunc in parte superiore evidenter pilosus et flores minores habet (var. *alpinum* Turcz. in schedis); folia griseo-viridia, adpressa, glabra, radicalia sub anthesi emarcida, petiolata, petioli foliorum caulinarum usque ad 1.5 cm foliorum basalium ad 7 cm longi; lamina usque ad 6—10 cm longa, 8—12 cm lata palmatim 5—7-secta, segmenta primaria late lanceolata, cuneata; segmenta secundaria lanceolato-lineariter 4—5 mm lata, vel lineariter 2—3 mm lata, dentibus obtusato-acuminatis; segmentum medium in parte latissima 4—7 mm latum. Racemus terminalis simplex densus, vel ramosus; flores coeruleo-violacei (in sicco) petiolos superantes, ca. 3 cm longi, 1.3 cm lati; cassis hians glabra 2—2.5 cm longa, in parte superiore 1.5—1.7 cm lata, 1 cm alta, rostro producto subcurvato; sepala lateralia rotundata vel triangulari-rotundata, usque ad 1.5 cm longa et lata, extus glabra, intus barbata, margine ciliata; sepala inferiora inaequalia, 1—1.2 cm longa et ca. 3 et 5 mm lata etiam extus glabra; nectaria stipite curvato, calcare capitato ca. 1 mm in diametro, cuculli paulo inflati 2—2.5 mm lati,

733 labio parvo exciso sursum incurvo; filamenta parce pilosa vel glabra, dilatata. Carpella 3—5 glabra.

Hab.: In steppis, pratis atque in sylvis.

Typus: Dauria Nerczinensis 1831. Turczaninov; in Herb. Ac. Sc. URSS conservatur. (Descriptis E. Steinberg).

27. **A. Czekanovskyi** Steinb. sp. nova. — *A. Napellus* δ . *racemosum* δ . *sibiricum* Rgl. in Ind. sem. Horti Petrop. (1861) 46; Bull. Soc. Nat. Mosc. XXXIV, 3 (1861) 109.

Perenne; radix biennis fusiformis; caulis 1—1.2 m altus, strictus fere simplex vel in inflorescentia ramosus, cylindricus, inferne glaber, superne in inflorescentia pedunculisque pilis brevibus mollibus patentibus vestitus, internodiis longis; folia viridia, glabra, inferiora longepetiolata, petioli 4—7 cm longi, superiora fere sessilia vel brevi-petiolata; lamina ambitu quinquangularis 10—12 cm lata, 8—9 cm longa, palmatim 5-secta, segmenta primaria longe cuneata in parte latissima 1—1.2 cm lata, segmenta secundaria bi-tripartita, partitionibus elongatis lanceolatis, 2—3 cm longis, 0.3—0.5 cm latis. Racemus terminalis laxiflorus 15—40 cm longus; flores obscure violacei, pedicellati, pedicelli 2.5—5 cm longi, cassis ca. 1.5 cm longa, in parte superiore 1 cm lata, 0.7—0.8 cm alta, hemisphaerica, apice rotundata fronte recto vel paulo sinuato; sepala lateralalia obovata, ca. 1.3 cm longa et 1 cm lata, extus et intus pubescens; sepala inferiora ca. 1 cm longa, 0.2 et 0.5 cm lata, minus extus pubescens intus glaber, majus extus hinc inde pubescens, filamenta glabra bidentata vel unidentata. Carpella 3 glabra.

Hab.: In silvis et ad ripas.

Typus: Sibiria. Prov. Krasnojarsk. In ripa sinistra flum. Czunja, in pratis inundatis inter frutices. 29. VII 1931. A. M. Rubin; in Herb. Ac. Sc. URSS conservatur.

28. **A. seravschanicum** Steinb. sp. nova. — *A. rotundifolium* Kar. et Kir. var. *elatio*r in sched.

Perenne; radicis grumae 4—12, fusiformes, 1—4(8) cm longae, 0.2—0.5 cm latae; caulis 20—100 cm altus, erectus, cylindricus, inferne glaber, superne et in inflorescentia pilis brevibus mollibus crispulis vestitus; folia radicalia 3—12 longe-petiolata, vaginata; lamina 8—15 cm lata, 4—9 cm longa, supra et infra glabra, orbiculata, 5—7-partita; partitiones late rhomboideae, 3-fidae, incisae, laciniae obtusiusculae puncto calloso terminatae. Racemus terminalis laxiflorus, 28—40 cm longus, inferne interdum ramosus; flores 1.8—2.5 cm longi, 1.5—2 cm lati, pedicelli 0.5—2 cm longi, infra medium hibrateolati; cassis extus pilis brevibus mollibus vestita, navicularis, 1.5—2.5 cm longa, 0.5—1 cm lata, coeruleo-lilacina margine lutea; sepala lateralalia 1.5—2 cm longa, 1—2 cm lata, margine undulata, pallide flavescentia; nectaria calcare globoso paulo curvato, labium appendices duos filiformes, usque ad 2 mm longos, 7—8-plo stipite breviores formans, filamenta pilosa vel rarius

734 glabra; antherae virides. Carpella 5, pilis albis crispulis vel rectis vestita, rarius glabra.

Hab.: In lapidosis regionis alpinae et in juniperetis, 2710—3070 m.

Typus: Asia Media. In jugi Turkestanici declivio boreali, m. Kurganak, ad fontes fluv. Au-Korczegai, juniperetum. 9 VIII 1934. K. Afanassjev; in Herb. Ac. Sc. URSS conservatur.

Planta habitu *A. rotundifolium* referens, sed foliis majoribus, floris colore et nectarii forma distincta est.

29. *A. angusticassidatum* Steinb. sp. nova.

Perenne; rhizoma cateniformis; caulis usque ad 50 cm altus, strictus, simplex, cylindricus, 6—7 mm crassus ad basin et in medio pilis brevibus rectis albis puberulus; folia inferiora leviter puberula petiolata, petioli 3.5—5 cm longi; folia media breviora, late petiolata, petioli 1—1.5 cm longi, 3—4 mm lati; folia superiora sessilia; lamina usque ad 4 cm longa, 4—5 cm lata, ambitu orbiculata, palmatim 5—7-secta, segmenta basi anguste cuneata, segmentum medianum in parte latissima 0.6—0.8 cm latum, lateralia angustiora; segmenta 2—5-partita, partitionibus dentibus longis obtusiusculisque glandula terminatis, 1.5—2.5 mm latis; folia supra fere glabra, pilis raris dispersis vestita subtus imprimis ad nervos densius pilosa, marginibus ciliata. Racemus terminalis densiflorus, usque ad 10 cm longus, rarius longior tunc rostelum longius saepe incurvum et cassis altior sed tunc solito rostro productum, saepe curvatum et casside altiore. Flores intense violacei 2.6—2.8 cm longi, 1.0—1.4 cm lati; cassis puberula, angusta, rostro recto cassis tergo subperpendiculari, 1.7—1.9 cm longa, in parte superiore 1.0—1.3 cm, in parte media 0.3—0.4 cm lata, 0.4—0.5 cm alta, rarius rostrum curvatum, cassis usque ad 1 cm alta; sepala lateralia fere rotundata leviter asymmetrica, extus puberula vel vix pilosa intus parce pilosa vel glabra, margine ciliata, 1.8—2 cm longa, 1.2—1.3 cm lata; sepala inferiora 1.0—1.1 cm longa, 1.5—3 et 3—6 mm lata, extus et intus parce pilosa, vel intus glabra, margine ciliata; nectaria stipite fere recto calcare capitato, cuculli leviter inflati, 2—2.5 mm lati, labio sursum declinato bilobo, filamenta sensim ad medium dilatata, pilosa. Carpella 3—4, glabra.

Hab.: Ad ripas.

Typus: Asia media. Prope fl. Sary-Dzhas. 1866. Krassnov; in Herb. Ac. Sc. URSS conservatur.

Differt ab omnibus speciebus seriei *Longituberosa* caule humiliore a basi puberulo, foliorum forma, petiolis latioribus et casside angusta.

30. *A. Saposhnikovii* B. Fedtsch. sp. nova.

Perenne; rhizoma tenue, cateniforme e tuberibus minutis concretis compositum, 5—6 mm longis latisque; caulis usque 55 cm altus, ad basin 2—3 mm crassus, cylindricus, pilis minutis tantum sub lente distinctis adpersum, in inflorescentia pubes densior e pilis crispis constans, rarius e pilis rectis;

735 folia 3—8, lamina eorum 25—40 mm longa, 50—60 mm lata, praesertim in triente inferiore caulis congesta, ambitu quinquangularis usque ad basin in partes quinque late cuneiformes partita; omnes partes 2—3-fidae, rotundato-acuminato-dentatae, 3—8 mm longae, 2—4 mm latae; pars media non fissa, 12—20 mmlt., folia utrinque glabrescentia, pilis paucis tantum ad nervos praedita, margine parce ciliata. Inflorescentia laxa racemosa, pauciflora; flores 4—8 pallide violacei basi albomaculati (in sicco), usque ad 28 mm longi, 12 mm lati; cassis florum evolutorum a sepalis lateralibus valde reflexa 14—16 mm longa, 11 mm lata prope rostrum, 5—7 mm alta, parce pubescens, subglabra, ad rostrum magis puberula, margine ciliata; sepala lateralalia subrotundata; interdum subinaequilateralialia, 10—14 mm longa, 10—12 mm lata, intus longe pilosa, extus glabra vel parce adspersa pilis crispis, margine ciliolata; sepala inferiora valde inaequalia 9—10 mm longa, 1—5 mm lata; intus subglabra, extus puberula; nectaris ungue subarcuato, calcare 0.5—1 mm longo, lamina 1—2 mm lata, apice in labium parvum recurvum emarginatum abiente; filamenta glabra, versus basin dilatata. Carpella 3, glabra.

Hab.: In sylvis abietinis, in vallibus fluviorum.

Typus: Asia media. Tian-Schan. In valle fl. Naryn inter fl. Imet et Kaschka-su. 20 VI—2 VIII 1913. W. Saposhnikow; in Herb. Ac. Sc. URSS conservatur.

31. *A. Tranzschelii* Steinb. sp. nova.

Perenne; rhizoma tenue cateniforme e tuberibus minutis concretis compositum, tubera usque ad 5 mm lata, 6—7 mm longa, fibrillis obsita; caulis usque ad 80 cm altus, strictus, basi 3—3.5 mm latus, pilis brevibus adpressis crispulis leviter vestitus, interdum in inflorescentia pilis patentibus obsitus; folia caulina basalia longepetiolata, petioli 7—15 cm longi, lamina 3—4 cm longa, 5—7.5 cm lata, supra pallide viridis, pubescentia tantum sub lente conspicua, subtus pallidior, omnino glabra, ambitu quinquangularis, 3—5-secta; segmenta late-cuneata, 2—3-partita, partitionibus late-obtusiusculodentatis; segmentum medianum in parte latissima 2—3 cm latum; sinus clausus vel fere clausus. Racemus terminalis pauciflorus, basi 1—2 ramulis instructus; flores pallide-violacei vel violacei (in sicco) usque ad 3 cm longi, 1.2 cm lati; cassis usque ad 2 cm longa, longe rostrata, 1.5—1.7 cm lata in parte superiore 0.5—0.8 cm alta apud flores ad amassin evolutos hians vix vel in rostro densius puberula; sepala lateralalia rotundata vel leviter asymmetrica, 1.3—1.5 cm longa et lata extus parce adpresse puberula, intus parce pilosa vel glabra, ciliata; sepala inferiora valde inaequalia 1.3—1.4 cm longa, 0.2—0.3 et 0.6—0.7 cm lata, extus adpresse pilosa, sepalum majus intus parce longe pilosum, minus — glabrum; nectaria stipite curvato, calcare capitato, 0.5—0.75 mm in diametro, cuculli usque ad 2 mm lati, labio bilobo sursum incurvo; filamenta glabra, ad basin dilatata, tantum unidentata vel edentula. Carpella 4—5, glabra.

Hab.: Ad rupes, in Juniperetis.

Typus: Asia Media. Kirghizia, distr. Osch. Prope Irkeschtam in Juniperetis 21 VII 1900. W. Tranzschel; in Herb. Ac. Sc. URSS conservatur.

Similis est *A. Saposhnikovii*, sed foliorum forma et floribus majoribus distinguitur.

ANEMONE L.

32. *A. petiolulosa* Juz. sp. nova (Subgen. *Eriocephalus* Hook. f. et Thoms., sect. *Oriba* Adans.).

Folia radicalia petiolis glabris, laminis 3-sectis, segmentis 2—15 mm longe petiolulatis (petiolulis haud raro quam ipse segmentum longioribus) usque ad basin 2—3-sectis segmentis secundi ordinis sessilibus vel medio breve petiolulato, vel (segmentis) fere usque ad basin 2—3-partitis, partitionibus ad; medium 2—3-fidis, lobulis integris vel 2—3-dentatis dentibus obtusis vel apice breve acuminatis, glabra; caulis 2—18 cm lg., petiolos foliorum radicalium 2—3-plo superans, glaber vel superne pilis singulis appressis praeditus; folia involucri 2—3, basi quasi in petiolum cuneiformem vel late linearem subito angustata, 3-partita partitionibus 3-fidis lobulis 2—3 dentatis. Pedunculi 1—3 appresse (superne densissime) pilosi, laterales in parte inferiore involucello 2-phyllo induti; flores saepius paullo declinati, postea nutantes 1—3 (—4) cm diam.; perianthium 5-phyllo phyllis ovatis, ellipticis vel oblongo-ellipticis apice rotundatis vel paullo angustatis, pallide luteis extus ± purpurascens et dense appresse pilosis; stamina filamentis basin versus dilatatis, antheris oblongo-linearibus; styli flavidi; carpella ca. 4 mm lg. Fl. fine III—IV.

Hab.: In declivibus argillosis, rarius lapideis stepposis et montanis Asiae Mediae (Tian-Schan occident., jug. Turkestanicum, Zeravschan, Kuhitang, montes Turcomaniae).

Typus: Prov. Syr-Darja, distr. Taschkent, ad declivia argillosa prope Ak-tasch in montibus Karshan-tau. 1922. 12. IV. fl. leg. Eug. Korovin; in Herb. Ac. Sc. URSS conservatur.

Affinitas: ab *A. biflora* DC. (planta iranica) et *A. Gortschakowii* Kar. et Kir. (planta tianschanica) imprimis foliorum structura omnino aliena optime distinguitur.

33. *A. almaatensis* Juz. sp. nova (Subgen. *Eriocephalus* Hook. f. et Thoms., sect. *Oriba* Adans.).

Valde affinis *A. Gortschakowii* Kar. et Kir., a qua notis sequentibus differt: tota planta debilior et gracilior, caule ad 25 cm alt.; folia magis dissecta segmentis medianis plerumque breve sed conspicue petiolulatis, plus quam ad medium, interdum fere ad basin 3-partitis partitionibus profundius lobulatis et praesertim dentatis dentibus valde elongatis paullo numerosioribus (numerus totalis dentium segmenti mediani 12—17 (—20), apice distinctius acuminatis; folia involucri quoad dissectionis modum radicalibus similia, dentibus quam in *A. Gortschakowii* quoque longioribus et acutioribus; perianthii

737 phylla plerumque quam in *A. Gortschakowii* paullo angustiora, versus apicem saepe angustata, oblongo-ovata. Floret IV.

Hab.: In declivibus montanis siccis montium Tian-Schan (vicin. opp. Alma-ata), solo argilloso.

Typus: Kazakhstania (olim prov. Semiretschje), in vicinit. opp. Alma-ata (olim Wierny) 1888 27 III., leg. J. Killoman; in Herb. Ac. Sc. URSS conservatur.

34. **A. oligotoma** Juz. sp. nova (Subg. *Eriocephalus* Hook. f. et Thoms., sect. *Oriba* Adans.).

Folia radicalia petiolis glabris, laminis 3-sectis segmentis sessilibus vel subsessilibus lateralibus ultra medium vel fere ad basin partitis partitionibus 2—3-dentatis vel plerumque ad $\frac{1}{3}$ 2—3-fidis lobulis 2-dentatis dentibus breviusculis creniformibus, segmento mediano plerumque non ultra medium 3-partito partitionibus 2—3-dentatis vel 2—3-fidis lobulis 2-dentatis, numerus totalis dentium segmenti mediani (5) 7—9 (12); caulis 6—20 cm alt.; folia involucri basi cuneata ad medium 3-partita partitionibus 2—3-lobulatis lobulis integerrimis et 2—3-dentatis dentibus obtusis vel acutiusculis. Pedunculi 1 vel 2, uniflori, lateralis juxta medium foliis involucelli 2 parvis praeditus, pilis sat densis appressis paullo crispatis vestiti; flores 1.5—3.5 cm diam.; perianthii phylla anguste oblongo-ovata vel late obovata, pallide lutea, extus rubescentia et adpresse pilosa; stamina filamentis basin versus dilatatis flavescentibus antheris lineari-lanceolatis luteis ca. 1 mm lg.; carpella ca. 3 mm lg., stylo iis duplo breviora. IV—initio V.

Hab.: In declivibus lapidosis montium, in schistosis et in pratis salsuginosis ad ripas fluvium Asiae Mediae (jugum Alaicum et in valle Alai).

Typus: in valle fl. Isfairam infra traject. Tengiz-bai, Dessiatova sub n° 1768; in Herb. Ac. Sc. URSS conservatur.

Affinitas: a proxima *A. Gortschakowii* Kar. et Kir. (specie tianschanica) foliis minus dissectis dentibus minus numerosis satis diversa.

35. **A. impexa** Juz. sp. nova (Subgen. *Homalocarpus* DC.).

Perennis; folia radicalia petiolis subflexuosis pilis erecto-patentibus vel laxe accumbentibus tectis, ambitu fere rotundata vel triangularia, trisecta segmentis breve petiolulatis cuneato-obovatis vel rhomboideis, profunde (lateralia fere ad basin) 2—3-partitis, partitionibus angustissimis superne profunde 2—3-fidis lobulis integerrimis lineari-lanceolatis vel linearibus acutis; supra glabra vel disperse pilosa, margine disperse vel sat dense breviuscule ciliata; caulis 12—45 cm alt. erectus saepe paullo flexuosus sicut petioli vestitus; folia involucri parva, usque ad $\frac{2}{8}$ — $\frac{3}{4}$ partita partitionibus lanceolatis vel anguste lanceolatis integerrimis acutis, sicut folia radicalia pilosa vel subtus sat dense pilosa. Pedunculi 3—4 in numero, florendi tempore foliis involucri subaequilongi vel triplo longiores, pilis accumbentibus

38 vestiti; flores 2—3.5 cm diam.; perianthii phylla obovata alba vel extus roseola extus plerumque ad nervum medium pilosa; fructus ignoti. VI—VII.

Hab.: In pratis alpinis Transcaucasiae australis.

Typus: m. Alagez, ad fontes fl. Dali-tschai, loco dicto Chadzhi-mugum-jurt, leg. N. A. Busch; in Herb. Inst. Bot. Acad. Sc. URSS conservatur.

Affinitas: ab *A. fasciculata* L. (in Caucaso late distributa) optime distinguitur pubescentia caulium petiolorumque, foliorum supra glabrescentium forma, eorum lobulis angustioribus; ab *A. protracta* (Ulbr.) Juz. (specie medioasiatica) jam segmento medio foliorum sessili abhorret.

36. *A. biarmiensis* Juz. sp. nova (Subgen. *Homalocarpus* Adans.).

Folia radicalia petiolis saepe valde elongatis pilis sat densis haud longis horizontaliter patentibus vel plerumque paullo reversis vestitis, laminis ambitu rotundato-reniformibus 3-sectis, segmentis conspicue petiolulatis petiolulis haud raro sat longis (ad 1.2 cm, in speciminibus maximis ad 2 cm lg.), late rhomboideis, lateralibus fere ad basin 2-partitis partitionibus latiusculis usque ad medium 2—3-fidis lobis oblongis integerrimis vel plerumque apice sat longe et irregulariter 2—4 inciso-dentatis, dentibus porrectis vel interdum curvatis plerumque acutiusculis, rarius obtusiusculis; supra plerumque glabra vel subglabra subtus pilis sparsis vel raro sat densis breviusculis vestita; caulis 15—65 cm alt. erectus sicut petioli vestitus; folia involucri plerumque ad $\frac{2}{3}$ partita partitionibus interdum integerrimis sed plerumque apice 2—3-fidis lobulis porrectis oblongis digitiformibus acutiusculis vel obtusis, quam radicalia saepius densius pilosa. Pedunculi 2—6 in numero initio foliis involucri subaequilongi, postea multo longiores, in planta fructifera valde elongati pilis haud densis tenuibus saepe paullo crispatis erecto-patentibus vestiti; flores haud magni vel mediocres 1.8—3 cm diam.; perianthii phylla elliptica vel obovata versus basin apicemque plerumque angustata, alba, utrinque glabra; carpella majuscula ca 7 mm lg. Floret VI—VII.

Hab.: in silvis montanis, in fruticetis, in schistosis et in declivibus herbosis apricis regionis silvaticae et alpinae montium Uralensium.

Typus: In monte Jurma leg. P. N. Krylov; in Herb. Ac. Sc. URSS conservatur.

Affinitas: ab affinibus bene differt structura et pubescentia foliorum radicalium et imprimis eorum segmentis distincte petiolulatis, ceterum foliorum involucralium denticulatione peculiari.

37. *A. Schrenkiana* Juz. sp. nova. (Subgen. *Homalocarpus* Adans.).

Folia caulina petiolis brevibus et paullo arcuatis vel longis et strictis pilis densissimis longis valde reflexis tectis, laminis ambitu late triangularibus 3-sectis segmentis latis lateralibus sessilibus vel breve petiolulatis, mediis fere semper conspicue et interdum sat longe (ad 1 cm lg.) petiolulatis, lateralibus fere ad basin 2 (—3)-partitis partitionibus 2—3-fidis lobulis integerrimis vel

739 2—3-dentatis, mediis subpinnato 3-partitis partitionibus 3-fidis lobulis integerrimis vel dentatis sicut dentes obtusiusculis vel obtusis; supra subglabra subtus pilis longis laxe accumbentibus vel patulis vestita; caulis 8—45 cm alt. erectus strictus vel subflexuosus sicut petioli vestitus; folia involucri parva ad $\frac{2}{3}$ partita partitionibus integerrimis vel apice 3-inciso-dentatis sicut dentes obtusiusculis vel obtusis, supra disperse subtus plerumque dense pilosa. Pedunculi plures involucri 2—4-plo superantes pilis erecto-patentibus paullo crispatis vestiti; flores parvi vel mediocres 1.7—3 cm diam.; perianthii phylla elliptica, basi et apice angustata, alba, subtus glabra vel ad basin et ad nervum medium interdum pilosa; fructus haud magni ca. 6 mm lg. late elliptici. Fl. VI—VII.

Hab.: In pratis et pratulis in regione silvatica et alpina montium Alatau Dshungarici et Tarbagatai.

Typus: iter Songoricum, leg. Schrenk; in Herb. Ac. Sc. URSS. conservatur.

Affinitas: medium tenet inter *A. protractam* (Ulbr.) Juz. et *A. crinitam* Juz., a priore imprimis pubescentia caulium et petiolorum, a posteriore segmento medio foliorum radicalium petiolulato et pilis caulium et petiolorum magis reversis diversa.

38. *A. crinita* Juz. sp. nova (Subgen. *Homalocarpus* Adans.).

Folia radicalia petiolis longis basi dilatatis pilis longis fere appressis subsericeis tectis ceterum pilis longissimis et densissimis horizontaliter patentibus et reflexis vestitis; laminis circumscriptione rotundato-reniformibus 3- vel plerumque (fere) 5-sectis segmentis latis sessilibus vel medio breve petiolulato triplicato 2—3-partitis acuminibus lineari-lanceolatis porrectis vel leviter curvatis acutiusculis vel acutis; subtus et plerumque margine pilis longis \pm densis, supra dispersis (plerumque ad nervos dispositis) tectis; caulis 12—45 cm alt. robustus erectus sicut petioli vestitus; folia involucri magna modo dissectionis et forma dentium radicalia revocantia subtus plerumque longe pilosa, supra disperse pilosa. Pedunculi 3—5 in numero, pilis densiusculis erecto-patentibus tenuiusculis paullo crispatis vestiti, tempore florendi involucri subaequilongi vel parum longiores, postea duplo et ultra, fructiferi triplo longiores; flores plerumque magni, 2—4 cm diam.; perianthii phylla obovata vel elliptica, alba, plerumque utrinque glabra; fructus magni, 6—9 mm lg., late obovati vel elliptici. Floret VI—VII.

Hab.: In pratis subalpinis et silvaticis, in marginibus silvarum, in declivibus herbosis, rarius in alpinis montium Sibiriae australis et Mongoliae borealis.

Typus: Sibiria occident., Prov. Tomsk, syst. fl. Abakan, in alpe Dzhozen, ad fontes fl. Kansas 1897 8 VII J. Wagner; in Herb. Acad. Sc. URSS conservatur.

Affinitas: a planta europaea (*A. narcissiflora* L. s. str.) pubescentia caulium petiolorumque e pilis longissimis constanter distinguenda.

39. **A. sachalinensis** Juz. sp. nova (Subgen. *Homalocarpus* Adans.).

Folia radicalia petiolis pilis horizontaliter patentibus sparsis v. parcis tecti, ambitu fere rotundata, 3-secta, segmentis distincte petiolulatis, latissimis, profunde 2—3-partitis partitionibus lobulatis, lobulis incisis acuminibus oblongis obtusiusculis vel obtusis; utrinque glabra vel parce pilosa, margine breve ciliata; caulis 15—35 cm alt. sat robustus strictus vel paullo flexuosus sicut petioli vestitus superne saepe glaber; folia involucri haud magni, bipartiti acuminibus obtusis, utrinque pilosa. Pedunculi 2—5 in numero, in planta fructifera elongati folia involucri 2—4-plo superantes, haud dense vel sparse pilosi. Flores adhuc ignoti, fructus 5—7 mm lg. Fr. fine VI.

Hab.: in cacumine montium ins. Sachalin, in lapidosis, in cembretis (*Pini pumilae* (Pall.) Rgl.).

Typus: In summo monte Ktauzi-pal (Pic de la Martinière) 1860 11 VII, fr. leg. Glehn; in Herb. Ac. Sc. URSS conservatur.

Affinitas: *A. sibiricae* L. sine dubio valde affinis sed habitu robustiore, foliorum et eorum segmentorum distincte petiolulatorum forma, dentibus foliorum obtusioribus satis diversa. Ab *A. biarmiensi* Juz. caulibus petiolisque minus dense pilosis, foliis minus dissectis distinguenda.

40. **A. brevipedunculata** Juz. sp. nova (Subgen. *Homalocarpus* Adans.).

Folia radicalia petiolis pilis haud longis horizontaliter patentibus vel paullo reflexis superne saepe sparsioribus tectis, ambitu rotundato-reniformia vel plerumque rotundata, 5-secta segmentis sessilibus late rhomboideis profunde (usque ad $\frac{3}{4}$) partitis partitionibus usque ad medium 2—3-lobulatis lobulis integerrimis vel plerumque apice profunde 2—3-inciso-dentatis sicut dentes acutiusculis vel acutis; supra plerumque solum ad nervos paullo pilosa subtus disperse pilosa margine breviter ciliata; caules 16—35 cm lg. erecti sicut petioli vestiti; folia involucri mediocria vel sat magna usque ad $\frac{3}{4}$ partita partitionibus superne 2—3-lobulatis lobulis integerrimis vel interdum 2—3-inciso-dentatis, sicut dentes acutiusculis, utrinque disperse pilosa (supra plerumque solum ad nervos). Pedunculi 2—5 in numero brevissimi 0.5—2 cm lg. quam folia involucri breviores, in planta fructifera fere non elongati, pilis sparsis erecto-patentibus tenuibus tecti; flores parvi 1.5—2.5 cm diam.; perianthium phyllis anguste ellipticis vel obovatis albis utrinque glabris; fructus 5—7 mm lg. Floret VI—VII.

Hab.: In silvis frondosis in declivibus montium regionis Ussuriensis.

Typus: in valle fl. Tjutiche, 1909 17 V, fl. N. V. Djukina; paratypus ad sin. Olgae 1907 27 VI, fr. N. Desoulavy; in Herb. Ac. Sc. URSS conservatur.

Affinitas: planta singularis *A. sibiricae* L. affinis sed jam pedunculis valde abbreviatis necnon loco natali distinctissima.

41. **P. Sukaczewii** Juz. sp. nova. (Subgen. *Campanaria* Endl.).

Petoli disperse patulo-pilosi, folia pilis dispersis parcisve longis patentibus vestiti; folia involucri sat dense patulo-pilosa; flores aperti, pallidi, solum extus leviter violaceo suffusi; reliqua *P. tenuilobae* (Hayek) Juz.

Hab.: in declivibus lapidosis Sibiriae orientalis ad lit. lac. Baical.

Typus: Lac. Baical, lit. occidentalis, 52°40' declivia lapidosa boreal. promont. (montis) Krestovka 1928 VI 30 fl. V. N. Sukaczew, K. A. Rassadina et N. A. Bryzshew; in Herb. Ac. Sc. URSS conservatur.

RANUNCULUS L.

42. **R. Krylovii** Ovcz. sp. nova. — *R. monophyllus* f. *latisectus* Ovcz. in Not. Syst. Hort. Petropol. III (1922) 55. — *R. altaicus* Rozanova in Trav. Inst. Petergoff (1931) n 8, non Laxm.

Planta perennis 10—20 (28) cm alta; radices tenues fasciculatae; caules solitarii vel pauci erecti aut plus minusve ascendenti-erecti, debiles, simplices raro paulo ramosi, glabri interdum in parte superiore vix puberuli, basi 1—2 squamis aphyllis; folia radicalia longepetiolata cordato-orbiculata plerumque usque ad medium vel profundius trifida, laciniae plus minusve late-rhomboidae margine rotundato-dentato-incisae raro folia subinterga, utrinque sparse puberula; dentes foliorum rotundato-oblongi margine integri aut subdenticulati apice plus minusve apiculati; folia caulina fere a basi partita segmentis oblongo-rhomboidis magnis margine irregulariter obtuse dentato-incisus, supra sparse puberulis subtus subglabris, 3—4-nerviis. Pedicelli adpresse puberuli; flores 1.2—1.5 (2) cm in diametro; sepala obovato-elliptica vix puberula ad 5—7 mm lg. vix patentia; petala obovata ad 7—10 mm lg.; receptaculum glabrum oblongum; carpella pubescentia rostro brevi erecto ad 0.5—0.8 mm lg. apice unciniforme curvato. Fl. VI—VIII.

Hab. In silva mixta, in betuletis et in montibus ad limitem superiorem silvarum reg. Altai, Alatau Dshungarici et Tian-Schan.

Typus: Kuznetzky Alatau, systema fl. Tom, in decliviis septentrionalibus m. Czalbykty-n-taiga. 1909. 27 VI 1909, fl. leg. B. N. Klopotov; in Herb. Ac. Sc. URSS conservatur.

Affinitas: a *R. monophyllo* Ovcz. segmentis foliorum caulinorum rhomboidis irregulariter incisis et foliis radicalibus saepe partitis bene differt.

43. **R. Popovii** Ovcz. sp. nova.

Planta 4—10 cm alta; radices fasciculatae longae vix fusiformiter incrassatae; caules 2—4 aut multi divergentes ramosi 4-pluriflori subadpresse dense et molliter villosi vel sublanati; folia radicalia petiolata, oblongo- vel spatulato-cuneata trilobato-incisa aut folia cuneato-ovata profunde 3—5 (6)-partita

42 laciniis oblongo-lanceolatis integerrimis vel paulo incis; lamina sparse villosa aut glabrescens; folia caulina inferiora radicalibus similia, superiora sessilia usque ad basin partita laciniis 3—4 elongatis lanceolato-linearibus vel linearibus; pedicelli dense-villosi. Flores pallide-lutei, 0.8—1.4 cm in diam., sepalis petalis brevioribus ovatis dense villosis pallide marginatis fructificatione subpersistentibus petalis oblongo-obovatis 6—8 mm lg. basi in unguem brevem abeuntibus; receptaculum oblongum brevissime villosum. Capitulum carpellorum oblongo-ovatum, densum, carpellis numerosis 1.2—1.8 mm lg. ovato-rotundatis sparse puberulis rostro brevi erecto apice incurvato. Fl. VI—VII.

Hab.: In decliviis siccis in montibus Tian-Schan orientalis.

Typus: Kaschgar. In jugo Sarykol; in loco Bartanterek. 1929 VII 11 n°. 123, M. G. Popov; in Herb. Ac. Sc. URSS conservatur.

Affinitas: a *R. Brotherusii* foliis radicalibus basi plus minusve cuneatis, lobatis vel partitis, statura robustiore, caulibus dense villosis differt.

44. **R. pauperculus** Ovcz. sp. nova. (§ *Auricomus*). — *R. Eschscholtzii* var. *asiatica* Kom. Fl. Kamtsch. II (1929) 140.

Planta perennis, 7—15 cm alta; folia radicalia glabra ambitu reniformi-rotundata profunde tripartita segmento medio oblongo obovato apice rotundato integerrimo vel vix denticulato. Flores mediocres 1.3—1.5 cm in diam.; sepalis glabris vel vix pubescentibus.

Hab.: In pratis alpinis et ad rivulos in Sibiria Orientali (Kamtschatka et insula Karaginsk).

Typus: Kamtschatka, Syst. fl. Palana, ad fl. Korkavajam 500 m, n° 3455 1930 VIII 13, P. T. Novogradnov, defl.; in Herb. Ac. Sc. URSS conservatur.

Affinitas: species nostra *R. Eschscholtzii* valde affinis a quo foliorum radicalium segmento medio integerrimo vel subintegerrimo et sepalis glabris atque statura humiliore differt.

45. **R. Krassnovii** Ovcz. sp. nova. — *R. pulchellus* var. *tridentata* O. Fedtsch. in A. H. P. XXI (1903) 18.

Planta perennis 4—9 cm alta; radices fasciculatae tenues; caules solitarii aut pauci, simplices vel in parte inferiore ramosi plus minusve dense pilis longis albis fere adpressis obtecti rarius glabrescentes; pedicelli fructificatione elongati validiusculi erecti caule longiores; folia radicalia petiolata, glabra plus minusve patentim sparse pubescentia ovato-elliptica basi rotundata aut plus minusve cuneata subintegerrima vel saepius trifida partitionibus mediis magis oblongo-ovatis attenuatis; folia caulina plus minusve sessilia radicalibus similia sed angustiora et profundius tripartita, superiora integerrima lanceolata aut tripartita partitionibus lineari-lanceolatis; pedicelli substriati plus minusve adpresse et dense albo-villosi. Flores 1—1.7 cm in diam.; sepala 5—6 mm lg. ovata adpresse-villosa plus minusve patentia margine saepius purpurea, petala 5—6 obovata ad 9 mm lg. basi cuneato-attenuata;

745 receptaculum glabrum, oblongum; capitulum carpellorum ovatum carpellis 1.8—2 mm lg. plus minusve obovatis glabris laevibus, 0.8—1 mm lg. rostro incurvato vel plus minusve uncinatiforme-incurvato. Fl. VII.

Hab.: In pratis alpinis vallium ad 3700—4230 m. s. m. in reg. Pamiricis et Tibetis.

Typus: Pamir, inter lacum Karakul et trajectum Muscol. O. A. et B. A. Fedtschenko; in Herb. Ac. Sc. URSS conservatur.

Affinitas: haec species nova *R. pseudohirculus* Schrenk affinis a quo indumento albo-sericeo, foliis radicalibus subintegerrimis vel trifidis differt.

46. *R. trisectilis* Ovcz. sp. nova. — *R. astrantiaefolius* var. *alpinus** Freyn in Somm. et Lev. Enum. pl. cauc. (1900) 7. — *R. caucasicus* var. *alpina* N. Busch (non Freyn) in Fl. cauc. crit. III, 3 (1903) 159.

Planta perennis 4—10 (20) cm alta; rhizoma breve; caules 1—3 tenues erecti aut basi ascendentes 1—2-flori, pilis sparsis sericeis subadpressis obtecti; folia radicalia plus minusve brevi-petiolata parva ambitu rotundata vel rotundato-ovata supra glabra subtus adpresse sericeo-pubescentia aut glabrescentia ex toto tripartita foliolis sessilibus rotundatis vel obovato-rotundatis apice serrato-incisis; folia caulina sessilia, inferiora profunde 3—4-partita laciniis lanceolatis, superiora 2—3-partita; pedicelli subsulcati adpresse puberuli. Flores 1—1.5 cm in diam., petalis obovatis basi cuneato-attenuatis apice vix denticulatis et sepalis oblongo-ellipticis obtusis villosis; receptaculum puberulum, lineare; carpella 2.5—3 mm lg. plana rotundato-ovata marginata rostro ad 1 mm lg. erecto apice uncinato. Fl. VII—VIII.

Hab.: In pratis alpinis montium Caucasi, ad 1900—2200 m. s. m.

Typus: Suania, in monte Tetenar supra pagum Ciolur ad flumen Hippum (Tzkhenis-Tzkhal), in pascuis alpinis 2200 m, 1890 VIII 1. S. Sommer et E. Levier; in Herb. Ac. Sc. URSS conservatur.

Affinitas: a. *R. Buhsei* Boiss. foliis tenuibus parvis, indumento molliter sericeo, statura minore et floribus carpellisque minoribus et habitatione differt.

47. *R. osseticus* Ovcz. sp. nova.

Planta 23—48 (55) cm alta; rhizomate incrassato obliquo aut horizontali; caules 1—2 in parte superiore longe ramosi ad basin pilis brevibus subadpressis vel subpatentibus tecti aut subglabri, 2-pauciflori; folia radicalia longe-petiolata ad 4—10 cm lt. et 3.5—7 cm lg. ambitu late-ovata vel rotundato-ovata tripartita partitionibus lateralibus sessilibus mediis petiolatis, omnibus fere ad basin tripartitis, laciniis oblongo-obcuneatis vel obovato-cuneatis partitis et dentato-incisis; folia caulina 3—5 sessilia partita partitionibus elongato-linearibus. Pedicelli subadpresse vel patentim breve pubescentes receptaculum apice pilosculum; flores 2.7—3.4 cm in diam. aurantiaco-flavi; sepala villosa ovata patentia; petala obovata; carpella glabra ad 3.5—3.8 mm lg. obovata compressa, plus minusve marginata apice rostro brevi ad 0.5—0.7 mm lg. uncinato.

Hab.: In pratis subalpinis in montibus Caucasi.

Typus: Caucasus, Ossetia, Schuatzchuri, ad fl. Bestauty-don. In fage-tis 2000 m, E. A. et N. A. Busch; in Herb. Ac. Sc. URSS conservatur.

Affinitas: species *R. caucasicus* M. B. affinis sed partitionibus folio-rum radicalium angustioribus profunde anguste tripartitis, rostro carpellorum brevior differt.

48. *R. dzhavakheticus* Ovcz. sp. nova.

Planta perennis 15—30 cm alta; rhizoma oblique adscendens in parte superiore pilis albis setosis tectum; caules pauci erecti simplices 1—3-flori pilis patentibus longis albis mollibus obtecti; folia radicalia numerosa longe-petiolata ambitu rotunda ad 3.5—4.5 cm lt. et 3—4.3 cm lg. basi anguste et profunde cordata, usque ad medium vel ultra tripartita segmentis lato-obcuneatis approximatis apice lobato-incisis et plus minusve denticulatis, dentes foliorum obtusi; lamina rigidiuscula supra glabra subtus sparse longe-pilosiuscula nervis bene prominentibus; folia caulina inferiora sessilia vel subpetiolata ambitu late-ovata ultra medium tripartita partitionibus incisis dentato-lobatis, superiora sessilia ex toto 2—3-partita laciniis linearibus subintegerrimis. Flores 2—3 cm in diam. laete-lutei petalis 5—7 majusculis late-obovatis apice plus minusve crenulatis; sepala patentia longe-villosa lutescenti-marginata. Receptaculum elongatum pilosiusculum. Carpella 2.5—3 mm lg. obovata compressa glabra rostro ad 0.5—0.7 mm lg. recto apice uncinato-incurvato. Fl. VII.

Hab.: In pratis alpinis et subalpinis montium Transcaucasiae ad 2700 m. s. m.

Typus: Transcaucasia, Georgia, prov. Tiflis, in m. Tzchra-Tzcharo, prata alpina. 2400 m. 1923 VII 8 V. Kozlovsky. Fl. (Plantae Orient. exsicc. 1928 n° 334); in Herb. Ac. Sc. URSS conservatur.

Affinitas: *R. oreophilo* M. B. valde affinis indumento molli, rhisomate bene evoluto, foliis rigidiusculis rotundatis et floribus majoribus differt.

49. *R. Buschii* Ovcz. sp. nova.

Planta perennis 20—35 cm. alta; rhizoma tenue abbreviatum supra pilis albis tectum; caules erecti, laeves a basi pilis patentibus sparse obtecti, simplices 1—2-flori; folia radicalia longe petiolata ambitu rotundato-ovata ex toto vel fere ad basin tripartita segmentis late rhomboideo-obovatis incisis et dentatis supra subglabris subtus praecipue ad nervos adpresse pilosiusculis aut glabrescentibus; folia caulina sessilia tripartita laciniis integerrimis raro incisis lineari-lanceolatis elongatis; pedicelli elongati plus minusve adpres-se puberuli; receptaculum pilosiusculum. Flores majusculi 3—3.3 cm in diam. petalis 5—9 oblango-obovatis basi cuneato-attenuatis apice crenulatis vel vix emarginatis; sepala obovata, albo membranaceo-marginata adpressepilosa patentia; capitulum carpellorum ovatum densum carpellis 2.6—3.2 mm lg.

745 obovatis rostro ad 0.5—0.6 mm lg. recto basi latiusculo, apice uncinato. Fl. VII—VIII.

Hab.: In pratis subalpinis montium Transcaucasiae ad 2200—3000 m. s. m.

Typus: Transcaucasia, Armenia. In regione alpina montis Abul. (distr. Achalkalaki). 1907 VII 25 E. Bordzilowski; in Herb. Ac. Sc. URSS conservatur.

Affinitas: *R. brachylobo* Boiss. proximus est, a quo caulibus elongatis erectis plus minusve puberulis, floribus majoribus, petalis et statura majore differt.

50. *R. submarginatus* Ovcz. sp. nova.

Planta perennis 20—40 cm alta; radices fasciculatae tenues; caules tenues ramosi pauciflori tenuiter sulcati basi squamis atro-fuscis ex foliis emortuis tecti, pilis albis vel subaurantiaco-albis patentibus vel declinatis obtecti rarius adpresse-pilosi; folia radicalia longe petiolata ambitu late rotundato-cordata vel reniformi-cordata profunde ad $\frac{1}{5}$ — $\frac{1}{7}$ partem tripartita segmentis divergentibus lateralibus profunde bifidis irregulariter late-rhomboides, mediis cuneato-rhomboides acute tripartitis, omnibus serrato-dentatis; lamina utrinque pilosiuscula subtus densius sericea; folia caulina sessilia tripartita partitionibus anguste lanceolatis vel linearibus integerrimis vel paulo incis; pedicelli adpresse breves pilosi tenues, sulcati. Flores 2—2.5 cm in diam.; petala late obovata, sepalis eis duplo brevioribus patenter pilosis; receptaculum pilosum; carpella obovata ad 3.5—4 mm lg. glabra, compressa vix convexa in parte inferiore emarginata rostro tenui recto ad 0.7—1 mm lg. apice spiraliter convoluto. Fl. VII.

Hab.: In silvis mixtis et frondosis interdum in pinetis.

Typus: Altai, distr. Bijsk, circa pag. Czernyi Anui. In silva mixta, n° 155, 1928 VII 2, E. G. Pobedimova fl. fr., in Herb. Ac. Sc. URSS conservatur.

Affinitas: a *R. nemoroso* DC. cui valde affinis carpellis semimarginatis rostris brevioribus et foliis acute incis et area geographica differt. Habitu *R. boreali* Trautv. similis sed receptaculo piloso bene differt.

51. *R. Smirnovii* Ovcz. sp. nova.

Planta perennis 50—65 cm alta; radices plus minusve crassiusculae, collo incrassato fibris ex foliorum emortuorum dense vestito; caules plus minusve multiflori, ramosi pilis setuliformibus longis inferne saepe rufescentibus obtecti; folia radicalia longe petiolata ambitu late rotundato-cordata, rotundato-reniformia vel ovato-rotundata plerumque basi profunde emarginata 9—13 cm lt., 7—9 cm lg. profunde interdum fere ad basin tripartita segmentis obovato-rhomboides, latis acute dentato-incis; lamina subtus saepius molliter sericeo-pilosa, petioli pilis rigidiusculis patentibus vel declinatis obtecti, vaginae saepius rufescenti-pilosae; folia caulina superiora sessilia vel subsessilia fere ex toto 3—5-partita partitionibus oblongo-rhomboides.

746 boideis vel lanceolato-oblongis serrato-dentatis. Flores 2—3.2 cm in diametro; sepala erecto-patentia vel vix patentia duplo-triplo petalis breviora; petala obovata basi cuneato-attenuata apice rotundata et interdum vix crenulata; carpella late-obovata plus minusve compressa tenuiter marginata, laevia rostro tenui, 0.6—0.8 mm lg. recto vel incurvato apice plus minusve uncinato; receptaculum glabrum. Fl. VI—VII.

Hab.: In silvis mixtis, laricetis et salicetis et in pratis silvaticis rarius in glareosis fluviorum in Sibiria Orientali.

Typus: Dauria Selengensis in montibus inter fl. Temnik et fl. Djida in monte Barun-Buran-Chan. In laricetis. 1912 VII 23 n° 455/2419. V. I. Smirnov; in Herb. Ac. Sc. URSS conservatur.

Affinitas: species *R. lanuginoso* L. affinis sed rostro carpellorum non spiraliter involuto et brevior, indumento et foliis forma bene differt. A *R. boreali* Trautv. statura majore, foliis majoribus, indumento et habitatione differt.

52. *R. jacuticus* Ovcz. sp. nova.

Planta perennis 20—40 cm alta; rhizoma breve incrassatum verticale aut fere non evolutum; caules solitarii vel pauci subsimplices vel ramosi canaliculati glabri sulcati laeves pauciflori; folia radicalia longe petiolata ambitu plus minusve cordata profunde fere ad basin tripartita partitionibus oblongo-obovatis basi plus minusve cuneatis, lateralibus latioribus saepe bifidis acute-serratis, mediis apice dilatatis incisus acute-dentatis, omnibus divergentibus; lamina glabra vel sparse adpresse pilosula, petioli glabri rarius pilis subadpressis longis debilibus tecti; folia caulina superiora sessilia 2—3-partita, laciniis lineari-lanceolatis basi per vaginam pilosam dilatatam semiamplexicaulia. Pedicelli adpresse pilosi plus minusve debiles; flores 1.8—2.8 cm in diam. praecipue 6-petali; sepala subadpressa vix patentia obtusata pilosa obovata; petala late-obovata, interdum crenulato-emarginata sepalis subduplo longiora; carpella 3.5—4 mm lg., obovata compressa laevia rostro tenui ad 1 mm lg. recto vix incurvato apice latiuscule spiraliter convoluto. Fl. VI—VII.

Hab.: In pratis et paludibus herbosis fluviorum in Jacutia.

Typus: Jacutia, in valle fl. Lena in loco Bulun 1914 VII 3 V. A. Kaskharov; in Herb. Ac. Sc. URSS conservatur.

Affinitas: a *R. boreali* Trautv. habitu, carpellorum rostro convoluto, foliis glabrioribus profunde partitis differt. A proximo *R. subcorymboso* Kom. carpellis, indumento, statura humiliore differt.

53. *R. stenopetalus* Ovcz. sp. nova.

Planta 6—8 cm alta caespites parvos formans; caules simplices glabri aut pilis debilibus brevibus sparse tecti vel vix ramosi 1—3-flori; radices fasciculatae incrassato-oblongo-cylindricae radiculis tenuibus intermixtis; folia radicalia petiolata glabra 10—13 mm lt. 6—9 mm lg. profunde ad $\frac{1}{4}$ — $\frac{1}{5}$

747 partem vel ad basin tripartita foliolis obovatis basi cuneato-attenuatis lobato incisus vel dentatis divergentibus; folia caulina sessilia parvula 2—3-partita laciniis lanceolatis vel linearibus integerrimis vel folia integra; pedicelli plus minusve patenter breves pilosi. Flores 1—1.7 cm in diam., aureo-lutei; sepala marginata glabra 5—7 mm lg.; petala 5—6 oblonga basi attenuata vel anguste oblonga, 0.8—1.1 cm lg.; receptaculum glabrum; carpella (immatura) compressa laevia glabra anguste submembranaceo-marginata 2—2.3 mm lg. obovata rostro brevi 0.5—0.6 mm lg. apice uncinato. Fl. VI.

Hab.: In pratis alpinis ad nives deliquescentes in montibus Pamiroalaicis.

Typus: in trajectu Peschkaut jugi Ferganensis, in alpinis, n° 686. 1913 V 22. N. A. Dessjatova; in Herb. Ac. Sc. URSS conservatur.

Affinitas: species nova *R. afghanico* Aitch. et Hemsl. et *R. mindshelkensi* B. Fedtsch. proxima ab ambobus petalis anguste-oblongis, floribus minoribus, foliolis vix incisus, caulibus tenuibus et debilibus et habitu bene differt.

54. *R. czimganicus* Ovcz. sp. nova. (§ *Ranunculastrum*).

Planta ad 45 cm alta; folia radicalia crassiuscula rigida integra apice late lobato-incisa et regulariter crenata basi \pm cuneata; caules validi striati in parte superiore remote ramosi multiflori \pm pilis adpressis setaceis obtecti. Capitulum carpellorum ovatum; carpella compressa \pm dense pilosa rostro elongato declinato-incurvato apice uncinato.

Typus: Asia media, Tian-Schan occidentalis, Czimgan, 1916 V 8. V. I. Lipsky. fr.; in Herb. Ac. Sc. URSS conservatur.

Affinitas: A *R. afghanico* Aitch. et Hemsl. statura robustiore, foliis rigidiusculis integris late lobatisque regulariter crenatis et basi cuneatis, carpellorum pilosorum rostro elongato declinato-incurvato bene differt.

55. *R. dilatatus* Ovcz. sp. nova (§ *Ranunculastrum*).

Planta ad 50 cm alta; folia tripartita segmentis lateralibus subsessilibus profunde 2—3-partitis et inciso-dentatis, mediis subpetiolatis plusquam ad medium tripartitis laciniis oblongo-rhomboideis apice 3-incisus et dentatis; caules pilis albis subsericeis patentibus obtecti apice ramosi. Flores mediores ad 2 cm in diam. sepalis ad medium puberulis patentibus demum subreflexis; capitulum carpellorum cylindricum ad 2—2.1 cm lg. ad 0.7 cm lt.; carpella ad 3—3.2 mm lg. \pm rotundata alata glabra vel margine vix ciliolata rostro brevissimo ad 0.6—0.8 mm lg. \pm incurvato apice subuncinato.

Hab.: In pratis steppaceis (?) montium Tian-Schan.

Typus: Tian-Schan, in jugo Alatau Transiliensi circa urb. Alma-ata, 1899 V 16, I. Killoman; in Herb. Ac. Sc. URSS conservatur.

Affinitas: a *R. Komarovii* Freyn foliis tripartitis non multipartitis, segmentis latoribus laciniis non petiolatis et carpellorum capitulo longiore differt.

PAPAVER L.

56. **P. pseudo-Stubendorffii** M. Pop. sp. nova (Sect. *Scapiflora* Rchb.).

A P. Stubendorffii A. Tolm. valde affini differt: capsulis setis sparsis munitis et disco capsulae in mucronem centalem producto.

Typus: Sibiria orientalis, ad fl. Aldan (syst. fl. Lena), non procul ab ostio fl. Tatty, 1928 Korzhevin n° 274; in Herb. Ac. Sc. URSS conservatur.

57. **P. ajanense** M. Pop. sp. nova (Sect. *Scapiflora* Rchb.).

Caespites amplos formans. Folia sparse albosetulosa, rarius setosa, mediocria, saepissime simpliciter pinnatisecta, segmentis integris lanceolatis angustis, rarius segmenta inferiora (vel pleraque) 2—4-lobata. Scapi erecti, 15—30 cm alti, firmi, erecti v. paulo flexuosi v. arcuato-adscendentes, folia 2—3-plo superantes. Alabastra ovalia, modice breviter albo-setulosa; corolla ca. 4 cm in diam., albo-rosea v. pallide crocea; capsulae angustae, clavatae, 12—18 mm longae, dense adpresse setosae, disco vix convexo, radiis fere nudis margine nec membranaceis v. anguste membranaceomarginatis.

A P. nudicauli L. (s. str.) valde affini differt: foliis glabrescentibus, alabastris glabriusculis pilis albis (nec rufescentibus) tectis petalisque in sicco aurantiacis (in vivo ex Vassiliev luteis!). *A P. microcarpo* DC. peraffini capsulis longioribus cum disco non umbilicato foliisque glabrescentibus diversum.

Typus: Sibiria orientalis, ad sinum Ukoï Oceani Pacifici. 10 VIII 1916. Anonymus (гидрограф. экспедиция Восточного океана); in Herb. Ac. Sc. URSS conservatur.

58. **P. involucratum** M. Pop. sp. nova. (Sect. *Scapiflora* Rchb.).

Caespitans, caespites ca. 10 cm latae. Folia numerosa breviter 5—8 cm longa; lamina parva pinnatipartita, segmentis integris oblongis acutiusculis ca. 10 mm longis, 3 mm latis. Scapi erecti multoties longiores, 20—40 cm alti, firmi, adpresse v. patentim pilosi. Alabastra sphaeroidea atrofusco-pilosa. Corollae parvae, 1—2 cm in diam., aurantiacae v. rubrae, basi flavescentes ad capsulam diu persistentes. Capsulae adpresse setosae, obovatae, subglobosae, usque ad 10 mm longae, disco pyramidato inter radios membranaceo. Species in sua sectione distinctissima.

Hab.: In alpinis elatioribus montium Tadzhikorum.

Typus: Asia Media, Pamir-Alai, ad fl. Zeravschan superior; in Herb. Ac. Sc. URSS conservatur.

59. **P. tianschanicum** M. Pop. sp. nova (Sect. *Scapiflora* Rchb.).

Caespitosum, caespites densae et latae. Folia numerosa, breviter; lamina parva pinnatipartita, segmentis approximatis latis oblongis v. ovatis obtusiusculis canescentibus, saepe dentatis. Scapi 5—15 cm alti, tenues, adpresse

749 v. patentim pilosi. Alabastra ovalia, dense atrofusco-setosa, ca. 10 mm longa. Corollae 3—4 sm in diam., petalis deciduis, siccis aurantiacis. Stamina ovario $1\frac{1}{2}$ -plo longiora. Capsulae parvae (ad 10 mm longae) adpresse albo-setosae; disco plano emembranaceo.

Hab.: In alpinis montium Tianschanicis omnium.

Typus: Asia Media, Tian-Schan, Jugum Kungei-Alatau, ad fl. Kebin, Abolin n° 3264; in Herb. Ac. Sc. URSS conservatur.

60. *P. pseudocanescens* M. Pop. sp. nova. (Sect. *Scapiflora* Rchb.).

Pumilum, 10—15 cm altum. Caespites parvi. Folia virescentia, parce villosa, segmentis approximatis latiusculis obtusis. Scapi firmi hirsuti apicem versus ferrugineo-hirti. Alabastra subglobosa, 10—12 mm in diam. dense atro-hirsuta. Corollae majusculae, ca. 5 cm in diam., flavae. Capsulae ferrugineo-setosae, obovatae, ca. 10 mm longae disco planiusculo radiis anguste marginatis.

Ab affinibus *P. canescens* A. Tolm. et *P. radiculatum* Rottb. differt: a primo pubescentia alabastrum et apice scaporum nigro-ferrugineo nec canescente, ab altero staminibus numerosissimis ovario longioribus.

Typus: Altai, in alpinis fluvii Topczugan, 1913 Kusnetzov et Tripolitova n° 2670; in Herb. Ac. Sc. URSS conservatur.

61. *P. ambiguum* M. Pop. sp. nova. (Sect. *Orthorhoeades* Fedde).

Caulis setis paucis patentibus vestitus, ramosus, erectus, firmus, usque ad 50 sm altus. Folia inferiora pinnati-lobata lobis latis dentatis v. crenatis. Folia superiora 3-partita segmentis pinnatifidis lobis integris v. subdentatis, lanceolatis v. linearibus. Pedunculi elongati firmi adpresse setosi. Corollae: magnae 6—7 cm in diam., puniceae, macula elongata a basi usque fere ad medium petali. Capsulae oblongo-clavatae, usque ad 18 mm longae, basin versus manifeste sed sensim angustatae substipitatae. Discus planiusculus membranaceus dentibus brevibus latis marginibus sese tegentibus.

Folia fere *P. dubii*, sed glabriora. Corollae eis *P. commutati* similes, sed macula a basi petali incipiens. Capsulae forma *P. dubii*, sed basi manifeste stipitatae et dentes disci sese tegunt, ut in *P. commutatum*. Verosimiliter *P. dubium* × *P. commutatum*.

Typus: Transcaucasia, prope Kodzhori, 2 V 1878, M. Smirnov n° 184; in Herb. Ac. Sc. URSS conservatur.

62. *P. lacerum* M. Pop. sp. nova (Sect. *Orthorhoeades* Fedde).

Glauescens glaber v. setis sparsis patentibus ad caulis basin et ad nervum medium foliorum subtus munitus. Folia lacerato- fere bipinnatipartita foliorum inferiorum lobi oblongi, irregulariter dentato-incisi lobulis brevibus obtusiusculis, foliorum superiorum lobi elongati lineares, acuti, remote et irregulariter secti lobulis saepe undulatis apice setiferis. Caulis ramosus, erectus, usque ad 40 cm altus. Pedunculi elongati erecti tenues sparse adpresse

750 setosi. Alabastra oblonga obtusa 10—11 mm longa, subpatentim sparseque albo-setulosa. Corollae roseo-rubrae, basi macula atra magna elongata ornatae, mediocres. Capsulae oblongo-clavatae, 13—14 mm longae, basi breviter substipitatae, disco plano v. planiusculo membranaceo dentibus (4—6) brevibus latis sese non tegentibus.

A P. laevigato valde affini differt foliis fere bipinnatisectis, macula petalorum magna (usque $\frac{2}{3}$ petali occupante), et area australiore (*P. laevigatum* M. B. tantum in Caucaso septentrionali (Ciscaucasia) et in Ucraina invenitur).

Typus: Asia Minor. Paphlagonia Wilajet Kostambuli Sintenis It. or. 1892 n° 3702. Marsifoun, Manissajian. Pl. or. n° 451b. — Specimina similia sed incompleta in Transcaucasia ad Araxem (pag. Chudoferinski, Radde n° 103), in Karabagh (Szovits, Hohenacker).

CORYDALIS

63. **C. Aitchisonii** M. Pop. sp. nova (Sect. *Leonticoides* DC. ser. *Longiflorae* M. Pop.).

A C. Severzovii Rgl. valde affini differt: foliorum tripartitorum segmentis lateralibus, indivisis, pedicellis fructiferis longioribus, atque area geographica separata (Paropamiz et Kopetdagh).

Typus: Asia media. Badghys (Paropamiz), Aitchison; in Herb. Ac. Sc. URSS conservatur.

64. **C. Nevskii** M. Pop. sp. nova. (Sect. *Leonticoides* DC., ser. *Longiflorae* M. Pop.).

A C. Aitchisonii M. Pop. valde affini differt: foliorum tripartitorum segmentis omnibus indivisis et area geographica (Darvaz, jugum Alaicum).

Typus: Asia Media, jugum Alaicum, ad pag. Sary Kamusch, fl. 24 IV 1913 Dessjatova n° 1660; in Herb. Ac. Sc. URSS conservatur.

65. **C. pseudoalpestris** M. Pop. sp. nova (Sect. *Dactylotuber* Rupr.).

5—8 cm alta. Tuber cylindricum 2—4 cm longum, simplex v. basi lobatum. Caules in inferiore parte subterranei, albi, tenues, foliis squamiformibus 2 muniti; folia caulina viridia saepissime 3; petioli longi basi membranaceo-dilatati. Lamina glauca parva, ternata, segmentis subsessilibus, approximatis, fere usque ad basin in lobos late cuneatos dentatos vel lobulatos fissis; lobuli ultimi oblongi v. lineari-oblongi; in foliorum axillis foliola nascuntur vel ramuli floriferi. Racemus folia non superans parvus, 1-vel 2—4 florus, floribus approximatis; bracteae (ut folia carnosulae) ovatae v. obovatae, obtusatae, parvae, tenuiter coeruleo-punctatae; pedicelli 2—3 mm longi, bracteis subduplo breviores; sepala 1 mm longa, angulata, alba, coeruleo-punctulata; corollae ca. 17 mm longae, albiae v. coerulescentes, apice azureo-violaceae; petalum inferum basi calcarato-dentatum; calcar petali superioris tenue rectum horizontale

751 apice ipsa sursum incurvum, petalo infero 2-plo longius; capsulae 10 mm longae, 5 mm latae, obtusae.

A *C. alpestri* C.A.M. valde affini differt: folio supremo racemum approximato, ideo pedunculo racemorum brevi, foliis carnosis, bracteis et sepalis dense azureo-punctatis et area geographica (separata).

Typus: Asia Media in montibus Tarbagatai Mustau, ad initia fl. Ulkun-Ulasty, fl. fr. 28 VII 1914. V. Saposhnikov (cum *C. inconspicua* Bge. mixta); in Herb. Ac. Sc. URSS conservatur.

66. *C. arctica* M. Pop. sp. nova (Sect. *Dactylotuber* Rupr.).

A *C. pauciflora* Steph. affini differt petalo infimo basi non gibboso-saccato, calcare brevi et area separata (arctica nec montana).

Typus: Jacutia, inter fl. Olenek et Lenam infer. ad ostia fl. Atyrkan, ad silvarum limites, fl. 3—4 VIII 1876, Czekanowski; in Herb. Ac. Sc. URSS conservatur.

67. *C. macrantha* M. Pop. sp. nova. — *C. gigantea* var. *macrantha* Rgl. (Sect. *Archaeocapnos* M. Pop.).

Rhizoma elongatum, apice incrassatum; caulis fistulosus crassus nitens erectus, 60 cm altus, in superiore parte ramosus; folia caulina 2—3 tenera membranacea breviter petiolata, maxima, superiora sessilia minora; lamina bis v. ter pinnatipartita, rhachis dichotome ramosa flexuosa, segmenta lateraliter alternata petiolulata pinnati-vel bipinnatipartita, lobis alternis in lobulos magnos lanceolatos v. oblongos, usque ad 7 cm longos, 3 cm latos, subtus pallidos, supra sordide virides profunde incis. Racemus terminalis (racemo unico laterali auctus) simplex cylindricus densus 5—10 cm longus, folia parum superans breviter et crasse pedunculatus; bractee anguste elongatae integrae: inferiores foliaceae anguste spatulatae usque ad 3 cm longae, superiores lineari-filiformes breviores; pedicelli 3—5 mm longi, erecti, firmuli; sepala mox caduca, magna, 5—9 mm longa suborbiculata integerrima; corollae 35—45 mm longae, paulo arcuatae sordide purpureae; calcar parum arcuato-adscendens crassum apice sensim attenuatum, petalo inferiore esaccato 2-plo longius.

A *C. gigantea* Trautv. et Mey. valde affini differt: statura humiliore, racemo paulo ramoso praeter racemum terminalem unus tantum ramus receptifer udest, corollis majoribus, 30—40 cm longis.

Typus: Sibiria orientalis, montes Burejae leg. Radde; in Herb. Ac. Sc. URSS conservatur.

68. *C. transalaica* M. Pop. sp. nova. (Sect. *Calocapnos* Spach., ser. *Strictae* M. Pop.).

Caespitosa, pumila, 10—15 cm alta, basi ad collum squamosa; folia radicalia 5—8 cm longa, petiolis crassiusculis angulatis, laminis ambitu ovato-oblongis sub 3-pinnatisectis, segmentis utrinque 3—4 breviter petiolulatis, lobulis ultimis oblongo-linearibus glaucis confertis; folia caulina valde dimi-

752 nuta, pauca (1—2), caules crassiusculi firmi striato-sulcati, subsimplices. Racemi simplices breves 3—4 cm longi densi; bracteae submembranaceae ovato-oblongae, breves, dentato-fimbriatae, apice setaceo-acuminatae; pedicelli ca. 3 mm longi, fructiferi deflexi; sepala hyalina ovato-oblonga, ca. 3 mm longa, acuta, fimbriata; corollae flavae angustae, ca. 15 mm longae, petalis exterioribus apice longo mucronatis, calcar saccato brevi, obtuso ca. 3 mm longo; capsulae lineares, pendulae, 10—15 mm longae, 2 mm latae, acutae; semina atra laevissima nitida caruncula minima adpressa plano-compressa.

A C. stricta Steph. valde affini differt: caule pumilo 10—15 cm alto, bracteis latioribus ovatis, capsulis angustioribus ca. 2 mm latis. An forma alpina *C. strictae*?

Typus: Asia Media, Pamir-Alai, jugum Transalaicum, in valle fl. Muksu, infra p. Kara-Mazar, 2 VII 1904 B. Fedtschenko; in Herb. Ac. Sc. URSS conservatur.

69. **C. pseudostricta** M. Pop. sp. nova (Sect. *Calocapnos* Spach, ser. *Strictae* M. Pop.).

Caules 30—60 cm alti, valde striato-angulati; fere a basi ramosi; folia glauca laminis latis sub 3-pinnatisectis, segmentis remotis longiuscule petiolulatis utrinque 4—5, lobis cuneatis lobulis ultimis oblongo-linearibus acutis. Racemi saepius simplices; pedicelli ca. 5 mm longi; bracteae lineares hyalinae, inferiores pedicellis sublongiores, superiores breviores; sepala ca. 4 mm longa hyalina parce denticulata; corollae luteae, ca. 18 mm longae, paulo arcuatae, petalis externis apice longe mucronatis; calcar 3 mm longum saccatum obtusum. Capsulae patentes v. subdeflexae, usque ad 20 mm longae, 2—3 mm latae.

A C. stricta Steph. affini differt: caulibus in superiore parte ramosis, corollis angustioribus foliorum segmentis longe petiolulatis nec subsessilibus. *A C. bucharica* M. Pop. peraffini differt: caulibus insigniter striatis sepalisque majoribus, atque foliorum lobis angustioribus.

Typus: Asia media, Pamir-Alai, in montibus Hissaricis, ad p. Taschkurgan; in Herb. Ac. Sc. URSS conservatur.

70. **C. bucharica** M. Pop. sp. nova (Sect. *Calocapnos* Spach, ser. *Strictae* M. Pop.).

Radix crassa multiceps, apice squamis et petiolorum reliquiis vestita; caules usque ad 50 cm alti, erecti, valde ramosi, tenuiter striati nec sulcati; folia radicalia longe petiolata, laminis 2—3 pinnatisectis, segmentis petiolulatis, lobulis ultimis latiusculis flabellato v. cuneato-obovatis; folia caulina simpliciora, breviter petiolata. Racemi ramosi; pedicelli ca. 5 mm longi tenues erecti; bracteae lanceolatae integrae inferiores subherbaceae, superiores hyalinae, margine interdum subdenticulatae; sepala ca. 2 mm longa hyalina denticulata apice caudato-acuminata; corollae aurantiaco-flavae, angustae, 15—18 mm longae, petala exteriora apice breviter apiculata; calcar tenue arcuato-deflexum v. subrectum 3—5 mm longum; capsulae erectae v. patentes,

753 10—15 (—25) mm longae, 2—3 mm latae, oblongo-lineares, acutae; semina atra nitida; caruncula minima adpressa plano-compressa.

A *C. kaschgarica* affini differt: segmentis foliorum pinnatipartitis, nec lobatis, racemo laxo elongato.

Typus: Asia Media, Pamir-Alai, Darvaz, inter p. p. Dzhumardzh et Omar ad fl. Piandzh, 5000' IX 1882 A. Regel; in Herb. Ac. Sc. URSS conservatur.

71. **C. pseudadunca** M. Pop. sp. nova. (Sect. *Calocapnos* Spach, ser. *Strictae* M. Pop.).

Caules 20—40 cm alti, crassiusculi, firmi, subcylindrici tenuissime striati; folia sub 3-pinnatisecta, laminis latiusculis, segmentis petiolulatis, lobulis ultimis oblongis v. sublinearibus. Racemi ramosi v. simplices, longiusculi, densi, floribus crebre dispositis; bractae lanceolato-lineares hyalinae breves; pedicelli ca. 5 mm longi tenues fructiferi patentes v. subreflexi; sepala ca. 1 mm longa hyalina denticulata; corolla flava 15 mm longa, petalo exteriore apice fere mutico, calcar 3—4 mm longum rectum obtusum; capsulae fere pendulae usque ad 25 mm longae, 2 mm latae.

A *C. kaschgarica* valde affini differt: foliorum segmentis bi- (interdum) pinnatipartitis nec lobatis, sepalis minoribus. A *C. Shelesnoviana* Rgl. et Schmalh. et *C. bucharica* M. Pop. similibus racemis densis distinguitur.

Typus: Asia Media, Jugum Alaicum, ad fl. Taldyksu (Gultscha) prope p. Sufi-Kurgan, 29 VI 1901. Alexeenko n° 450; in Herb. Ac. Sc. URSS conservatur.

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„ typicus var. <i>reniformis</i>		<i>cymbalaria</i> Ldb.	330
Rozan.	381	„ var. <i>americanus</i> DC.	330
„ ssp. <i>typicus</i> Korsh.	377	<i>czimganicus</i> Ovcz.	493
„ var. <i>typicus</i> Rupr.	377	<i>dahuricus</i> Rozan.	382
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<i>baidarae</i> Rupr.	435	<i>daucifolius</i> Stev.	487
<i>baldshuanicus</i> Rgl.	472	<i>dilatatus</i> Ovcz.	497
<i>balkharicus</i> N. Busch	451	<i>dissectus</i> M. B.	459
<i>Baudotii</i> var. <i>submersus</i> Litw.	349	<i>divaricatus</i> Schrank	340
<i>biformis</i> W. Koch	378	„ Ldb.	338
<i>Boissieri</i> Simonk.	424	<i>divergens</i> Aitch.	493
<i>borealis</i> Kryl.	462	<i>diversifolius</i> Gilib.	345
„ Trautv.	461, 462	<i>dolosus</i> Fisch. et Mey.	409
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„ var. <i>glabrata</i> Trautv.	462	„ F. Schultz	340
„ var. <i>pumilis</i> Wahlb.	464	<i>dzhavacheticus</i> Ovcz.	438
„ var. <i>typica</i> Trautv.	463	<i>edulis</i> Boiss. et Hohen.	334
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<i>Brotherusii</i> Freyn	398	<i>elegans</i> Koch	456
<i>brutius</i> Ten.	418	<i>Eschscholtzii</i> Schlecht.	398
<i>Buhsei</i> Boiss.	424	„ var. <i>asiaticus</i> Kom.	398
<i>bulbosus</i> L.	449	<i>falcatus</i> Pers.	324
<i>Buschii</i> Ovcz.	443	<i>falcatus</i> M. B.	324
<i>Calvertii</i> Boiss.	455	<i>Ficaria</i> L.	333
<i>calthaefolius</i> Jord.	333	„ var. β. Ldb.	333
<i>carinatus</i> Freyn	344	„ var. <i>calthaefolius</i> Schmalh.	333

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<i>Severovii</i> Rgl.	498, 500	<i>vitifolius</i> Boiss. et Bal.	430
" ssp. <i>Winkleri</i> M. Pop.	500	<i>Reflexa</i> Ulbr. subsect.	250
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" Rozan.	382	<i>Richardsonia</i> Ulbr. sect.	255
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" " f. <i>glabriusculus</i> Alb.	420	<i>bicolor</i> Rgl.	597
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" var. <i>partitus</i> Rupr.	403	<i>orientalis</i> Boiss.	596
<i>stenopetalus</i> Ovez.	491	<i>refracta</i> DC.	597
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" " f. <i>umbrosus</i> Kom.	469	<i>Sassafras ferretianum</i> Mass.	572
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" var. <i>altaica</i> Trautv.	400	<i>Sophorocapnos</i> Turcz. sect.	700
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<i>tauricus</i> Freyn	452	Thalictrum L.	510
<i>tenuilobus</i> Rgl.	500	<i>acutilobum</i> DC.	520
<i>tenuiculatus</i> M. B.	324	<i>adiantifolium</i> Bess.	524
<i>trachycarpus</i> Fisch. et Mey.	477	<i>affine</i> Ldb.	526
<i>transiliensis</i> M. Pop.	401	<i>agreste</i> Kar. et Kir.	524
<i>Trautvetterianus</i> Rgl.	403	<i>alpinum</i> L.	519
<i>trichophyllus</i> N. Busch	346	<i>amurense</i> Maxim.	527
" Chaix	344	<i>angustifolium</i> L.	527
<i>triphyllos</i> Wallr.	343	<i>angustifolium</i> L. p. p.	526
<i>trisectilis</i> Ovez.	427	<i>appendiculatum</i> C. A. M.	524
<i>tuberculatus</i> C. A. M.	478	<i>aquilegifolium</i> L.	512
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" var. <i>lanuginosus</i> Franch.	494	<i>atropurpureum</i> Jacq.	512
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" " var. <i>minor</i> Ovez.	391	<i>chinense</i> Freyn	524
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" ssp. <i>acutilobus</i> N. Busch	431, 432	<i>divergens</i> Link	527
" ssp. <i>Baidaræ</i> N. Busch	443	<i>elatum</i> auct.	524
" " " Smirn.	435	<i>exaltatum</i> C. A. M.	526
" " <i>brachylobus</i> N. Busch	440	<i>filamentosum</i> Maxim.	516
" var. <i>brachylobus</i> Boiss.	440	<i>flavovirens</i> Ldb.	524
" ssp. <i>crassifolius</i> Smirn.	436	<i>flavum</i> L.	527
" β. <i>Sartorianus</i> Boiss.	437	<i>foetidum</i> L.	520
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<i>kamtschaticum</i> Nylander	524	<i>asiaticus</i> L.	49
<i>kemense</i> Fries	524	„ var. <i>chinensis</i> Maxim.	47
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<i>nigricans</i> Jacq.	527	<i>patulus</i> Salisb.	46
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<i>pauciflorum</i> Steph.	526	<i>patulus</i> Ldb.	48
<i>petaloideum</i> L.	518	„ var. <i>sibiricus</i> Rgl. et Til.	48
<i>podolicum</i> Lecoyer	525	<i>Riederianus</i> Fisch. et Mey.	50
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<i>rufinerve</i> Lej. et Court.	527	<i>somcheticus</i> C. Koch	46
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<i>simplex</i> Ldb.	526	„ Korsh.	509
<i>sparsiflorum</i> Turcz.	513	„ var. <i>japonica</i> Huth	509
<i>squarrosus</i> Steph.	523	<i>Tripterium</i> DC. sect.	512
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<i>trigynum</i> Fisch.	523	<i>Xiphocoma</i> (Stev.) Ovcz. sect.	483
<i>trispermum</i> Fisch.	523	<i>Xiphocoma</i> Stev.	351, 483
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<i>tuberiferum</i> Maxim.	515	<i>dasycarpa</i> Stev.	487
<i>viperinum</i> Andrz.	524	<i>orientalis</i> Stev.	484

VEGETATION REGIONS OF THE USSR

Abbreviated name	Full name
I. Arctic	
1. Arc. Eur.	Arctic (European part)
2. Nov. Z.	Novaya Zemlya
3. Arc. Sib.	Arctic (Siberia)
4. Chuk.	Chukchi
5. An.	Anadyr
II. European part	
6. Kar.-Lap.	Karelia-Lapland
7. Dv.-Pech.	Dvina-Pechora
8. Balt.	Baltic States
9. Lad.-Il'm.	Ladoga-Il'men
10. U. V.	Upper Volga
11. V.-Kama	Volga-Kama
12. U. Dnp.	Upper Dnieper
13. M. Dnp.	Middle Dnieper
14. V.-Don	Volga-Don
15. Transv.	Transvolga area
16. U. Dns.	Upper Dniester
17. Bes.	Bessarabia
18. Bl.	Black Sea area
19. Crim.	Crimea
20. L. Don	Lower Don
21. L. V.	Lower Volga
III. Caucasus	
22. Cisc.	Ciscaucasia
23. Dag.	Dagestan
24. W. Transc.	Western Transcaucasia
25. E. Transc.	Eastern Transcaucasia
26. S. Transc.	Southern Transcaucasia
27. Tal.	Talysh
IV. West Siberia	
28. Ob	Ob region (from the eastern slopes of the Urals to the Yenisei River)
29. U. Tob.	Upper Tobol
30. Irt.	Irtysk
31. Alt.	Altai

V. East Siberia

32. Yenisei	Yenisei
33. Lena-Kol.	Lena-Kolyma
34. Ang.-Say.	Angara River-Sayans
35. Dau.	Dauria

VI. Far East

36. Kamch.	Kamchatka
37. Okh.	Okhotsk
38. Ze.-Bu.	Zeya-Bureya
39. Uda	Udar River area
40. Uss.	Ussuri
41. Sakh.	Sakhalin

VII. Soviet Central Asia

42. Ar.-Casp.	Aral-Caspian
43. Balkh.	Lake Balkhash area
44. Dzu-Tarb.	Dzungaria-Tarbagatai
45. Kyz. K.	Kyzyl-Kum
46. Kara K.	Kara-Kum
47. Mtn. Turkm.	Mountainous part of Turkmenistan
48. Amu D.	Amu Darya
49. Syr D.	Syr Darya
50. Pam.-Al.	Pamir-Alai
51. T. Sh.	Tien Shan

Accepted Regions for Indication of General Distribution of Species Appearing in "Flora of the U. S. S. R."

I. Arc.	Arctic (Spitsbergen, Greenland and farther)
II. Scand.	Scandinavia (Norway, Denmark, Sweden, Finland)
III. Centr. Eur.	Central Europe (Germany, Poland, Czechoslovakia, Hungary, Austria, Switzerland)
IV. Atl. Eur.	Atlantic Europe (Netherlands, Belgium, England, France, Portugal)
V. Med.	Mediterranean (including North Africa)
VI. Bal.-As. Min.	Balkan Peninsula and Asia Minor
VII. Arm.-Kurd.	Lesser Armenia and Kurdistan
VIII. Iran.	Iran and Afghanistan
IX. Ind.-Him.	India and Himalayas
X. Dzu.-Kash.	[Dzungaria-Kashgar area] Eastern or Chinese Turkestan (Sinkiang)
XI. Mong.	Mongolia

XII. Jap.-Ch.	Japan and China
XIII. Ber.	North American coast of the Bering Sea
XIV. N. Am.	North America (U. S. A. and Canada)
XV. Tib.	Tibet

Other Geographical Abbreviations

Afr.	Africa
Aust. :	Australia
Centr.	Central
E.	East(ern)
Gr.	Great, Greater
I.	Island
Is.	Islands
Mt.	Mount
Mts.	Mountains
N.	North(ern)
R.	River
S.	South(ern)
W.	West(ern)

TRANSLATOR'S NOTE

1. The Russian term "Srednyaya Aziya" is, in English, Central Asia (or Soviet Central Asia). Therefore the term Middle Asia has been used for Russian "Tsentral'naya Aziya," which is non-Soviet inner Asia, comprising western China (Sinkiang and Tibet) and Mongolia.

2. According to Russian usage, the European part of the USSR is "eastern Europe." Therefore "western Europe" includes the whole of Europe outside the USSR.

EXPLANATORY LIST OF ABBREVIATIONS OF RUSSIAN
INSTITUTIONS AND PERIODICALS APPEARING
IN THIS TEXT

Abbreviation	Full names (transliterated)	Translation
Bot. -geogr. issled. v Turkest.	Botaniko-geograficheskie issledovaniya v Turkestane	Botanical and Geographical Investigations in Turkestan
Bot. Mat. Gerb. Bot. inst. AN SSSR	Botanicheskie Materialy Gerbariya Botaniches- kogo instituta AN SSSR	Botanical Materials of the Herbarium of the Botanical Institute of the Academy of Sciences of the USSR
Bot. Mat. Gerb. Gl. Bot. Sada	Botanicheskie Materialy Gerbariya Glavnogo Botanicheskogo Sada	Botanical Materials of the Herbarium of the Main Botanical Gardens
Bot. zap. SPb. univ.	Botanicheskie zapiski Sankt-Peterburgskogo universiteta	Botanical Notes of St. Petersburg University
Bot. zhurn. SSR	Botanicheskii zhurnal SSSR	Botanical Journal of the USSR
Byull. Glavn. Bot. Sada	Byulleten' Glavnogo Botanicheskogo Sada	Bulletin of the Main Botanical Gardens
Byull. Obshch. lyubit. estest- vozn., antrop. i etnogr.	Byulleten' Obshchestva lyubitelei estestvozna- niya, antropologii i etnografii	Bulletin of the Naturalists', Anthropologists' and Ethnographers' Society
Dendr.	Dendarii	Arboretum
Der. i kust.	Derev'ya i kustarniki	Trees and Shrubs
Der. i kust. Kavk.	Derev'ya i kustarniki Kavkaza	Trees and Shrubs of the Caucasus
Dikie polezn. i technich. raste- niya SSSR	Dikie poleznye i tekhnichesk- skie rasteniya SSSR	Wild Useful Plants and Industrial Crops of the USSR
Dikorastushchie r. Kavkaza, ikh rasprostranenie, svoistva i pri- menenie	Dikorastushchie raste- niya Kavkaza, ikh ras- prostranenie, svoistva i primeneniye	Wild Plants of the Caucasus, Their Distribution, Properties and Uses
Dokl. AN. Azerb. SSR	Doklady Akademii Nauk Azerbaidzhanskoi SSR	Reports of the Academy of Sciences of the Azerbaijan SSR
Fl.	Flora	Flora
Fl. Abkh.	Flora Abkhazii	Abkhazian Flora

Fl. Almat. zapovedn.	Flora Alma-Atinskogo zapovednika	Flora of the Alma-Ata Reserve
Fl. Alt.	Flora Altaya	Altai Flora
Fl. Alt. i Tomsk. gub.	Flora Altaiskoi i Tomskoi gubernii	Flora of Altai and Tomsk Provinces
Fl. Az. Ross.	Flora Aziatskoi Rossii	Flora of Asiatic Russia
Fl. Evrop. Rossii	Flora Evropeiskoi Rossii	Flora of European Russia
Fl. Gruzii	Flora Gruzii	Georgian Flora
Fl. Kamch.	Flora Kamchatki	Kamchatkan Flora
Fl. Kavk.	Flora Kavkaza	Caucasian Flora
Fl. Man'chzh.	Flora Man'chzhurii	Manchurian Flora
Fl. Mosk. gub.	Flora Moskovskoi gubernii	Flora of Moscow Province
Fl. Sev. Kraya	Flora Severnogo Kraya	Flora of the Northern Territory
Fl. Sakh.	Flora Sakhalina	Flora of Sakhalin
Fl. Sib.	Flora Sibiri	Siberian Flora
Fl. Sib. i Dal'n. Vost.	Flora Sibiri i Dal'nego Vostoka	Flora of Siberia and the Far East
Fl. Sr. Ross.	Flora srednei Rossii	Flora of Central Russia
Fl. Talysh.	Flora Talysha	Talysh Flora
Fl. Vost. Evr. Ross	Flora Vostochnoi Evropeis- koi Rossii	Flora of East European Russia
Fl. Yugo-Vost.	Flora Yugo-Vostoka	Flora of the Southeast
Fl. Yugo-zap. Poss.	Flora Yugo-zapadnoi Possii	Flora of Southwest Russia
Fl. Yur. bot. -sada	Flora Yur'evskogo botani- cheskogo sada	Flora of Yur'ev Botanical Garden.
Fl. Zap. Sib.	Flora Zapadnoi Sibiri	Flora of West Siberia
Gerb. donsk. fl.	Gerbarii donskoi flory	Herbarium of Don Flora
Gerb. Orlovsk. gub.	Gerbarii Orlovskoi gubernii	Herbarium of Orel Province
Gerb. Ukr. fl.	Gerbarii Ukrainskoi flory	Herbarium of Ukrainian Flora
GRF	Gerbarii Russkoi Flory	Herbarium of Russian Flora
III. Fl. Mosk. gub.	Illyustrirovannaya Flora Moskovskoi gubernii	Illustrated Flora of Moscow Province
Izv. AN SSSR	Izvestiya AN SSSR	Bulletin of the Academy of Sciences of the USSR
Izv. Bot. Sada	Izvestiya Botanicheskogo Sada	Bulletin of the Botanical Gardens
Izv. Bot. Sada Petra Vel.	Izvestiya Botanicheskogo Sada Petra Velikogo	Bulletin of Peter the Great Botanical Gardens
Izv. Gl. Bot. Sada	Izvestiya glavnogo Bota- nicheskogo Sada	Bulletin of the Main Botanical Gardens
Izv. Kavk. Muzeya	Izvestiya Kavkazskogo Muzeya	Bulletin of the Caucasian Museum
Izv. Kazakhst. fil. AN SSSR	Izvestiya Kazakhtan- skogo Filiala Akademii Nauk SSSR	Bulletin of the Kazakhstan Branch of the Academy of Sciences of the USSR

Izv. Kievsk. Bot. Sada	Izvestiya Kievskogo Botanicheskogo Sada	Bulletin of the Kiev Botanical Gardens
Izv. Obshch. lyubit. estestvozn., antrop. i etnogr.	Izvestiya Obshchestva lyubitelei estestvoznaniya, antropologii i etnografii	Bulletin of the Naturalists', Anthropologists' and Ethnographers' Society
Izv. Tadzhik. Bazy AN. SSSR	Izvestiya Tadzhikskoi Bazy Akademii Nauk	Bulletin of the Tadzhikistan Base of the Academy of Sciences of the USSR
Konsp. rast. okr. Khar'kova	Konspekt rastenii okruga Khar'kova	Compendium of Plants of Kharkov
Korm. rast. Estestv. senokosov i pastb. SSSR	Kormovye rasteniya estestvennykh senokosov i pastbishch SSSR	Fodder Plants of Natural Hay-meadows and Pastures of the USSR
Lesn. zhurn. Mat. (dlya) Fl. Kavk.	Lesnoi zhurnal Materialy dlya Flory Kavkaza	Forestry Journal Materials on Caucasian Flora
Nov. obozr. Ob. rast. Kievsk. uch. OKR.	Novoe obozrenie Obzor rastitel'nosti Kievskogo uchebnogo okruga	New Review Survey of Vegetation in the Kiev Educational District
Och. obozr. i fl. Karpat	Ocherki rastitel'nosti i flory Karpat	Survey of Carpathian Vegetation and Flora
Ocherk. Tifl. fl.	Ocherki Tiflisskoi flory	Survey of Tiflis [Tbilisi] Flora
Opis. Amur. obl.	Opisanie Amurskoi oblasti	Description of the Amur Region
Opred. der. i kust.	Opredelitel' derev'ev i kustarnikov	Key to Trees and Shrubs
Opred. rast. Dal'nevost. kr.	Opredelitel' rastenii Dal'nevostochnogo Kraya	Key to Plants of Far Eastern Territory
Opred. rast. Kavk.	Opredelitel' rastenii Kavkaza	Key to Caucasian Plants
Opred. vyssh.	Opredelitel' vysshikh rastenii	Key to Higher Plants
Opred. (vyssh.) rasten. Evrop. chasti SSSR	Opredelitel' (vysshikh) rastenii Evropeiskoi chasti SSSR	Key to Higher Plants of the European USSR
Perech. rast. Turk.	Perechen' rastenii Turkmenii	List of Turkmenian Plants
Pochv. eksped. v bass. r. r. Syr-Dar'i i Amu-Dar'i	Pochvennaya ekspeditsiya v basseiny rek Syr-Dar'i i Amu-Dar'i	Soil Science Expedition to the Syr-Darya and Amu-Darya River Basins
Putesh. Rast. i fl. Karpat.	Puteshestviya Rasteniya i flora Karpat	Travels Plants and Flora of the Carpathians
Rast. letn. pastb. Gandzh.	Rasteniya letnikh pastbishch Gandzhi	Vegetation of Gandzha [now Kirovabad] Summer Pastures

Rast. res. Turkm.	Rastitel'nye resursy Turkmenii	Plant Resources of Turkmenia
Rast. resursy Kavkaza	Rastitel'nye resursy Kavkaza	Plant Resources of the Caucasus
Rast. Sib.	Rastitel'nost' Sibiri	Vegetation of Siberia
Rast. Sr. Az.	Rastitel'nost' Srednei Azii	Vegetation of Soviet Central Asia
Rastit. Kavk.	Rastitel'nost' Kavkaza	Vegetation of the Caucasus
Rastit. pokrov. vost. Pamira	Rastitel'nyi pokrov vostochnogo Pamira	Plant Cover of the Eastern Pamirs
Rastit. syr'e Kazakhst.	Rastitel'noe syr'e Kazakhstana	Plant Resources of Kazakhstan
Pastit. zapovedn. Guralash i Zaaminks. lesn. ugodii	Rastitel'nost' zapovednika Furalash i Zaaminskikh lesnykh ugodii	Vegetation of Guralash Reserve and Zaamin Forest Lands
Rezul't dvukh puteshevstv. na Kavk.	Rezul'taty dvukh puteshestvii na Kavkaz	Results of Two Travels to the Caucasus
Russk. Fl.	Russkaya Flora	Russian Flora
Russk. lek. rast.	Russkie lekarstvennye rasteniya	Russian Medicinal Plants
Sbor, sushka i raz. lek. rast.	Sbor, sushka i razvitie lekarstvennykh rastenii	Gathering, Drying and Development of Medicinal Plants
Sorn. rast. SSSR	Sornye rasteniya SSSR	Weed Plants of the USSR
Sov. Bot.	Sovetskaya Botanika	Soviet Botany
Spis. rast.	Spisok rastenii	List of Plants
Tr. Bot. inst. AN SSSR	Trudy Botanicheskogo instituta AN SSSR	Transactions of the Botanical Institute of the Academy of Sciences of the USSR
Tr. Bot. Sada	Trudy Botanicheskogo Sada	Transactions of the Botanical Gardens
Tr. Bot. Sada Yur'evsk. Univ.	Trudy Botanicheskogo Sada Yur'evskogo Universiteta	Transactions of the Botanical Gardens of Yur'ev [now Tartu] University
Tr. Byuro prikl. Bot.	Trudy Byuro po prikladnoi botanike	Transactions of the Bureau of Applied Botany
Tr. Dal'nevost. bazy AN SSSR	Trudy Dal'nevostochnoi bazy AN SSSR	Transactions of the Far Eastern Base of the Academy of Sciences of the USSR
Tr. Inst. nov. lub. syr'ya	Trudy Instituta novogo lubyanogo syr'ya	Transactions of the Institute of New Fiber Raw Materials
Tr. Obshch. isp. prir. Khark'k. univ.	Trudy Obshchestva ispytatelei prirody Khar'kovskogo universiteta	Transactions of Naturalists' Society of Kharkov University
Tr. Obshch. sadov. v Odesse	Trudy obshchestva sadov- odov v Odesse	Transactions of the Odessa Horticulturists' Society

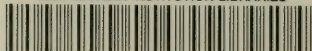
Tr. odessk. obshch. sadov	Trudy Odesskogo obshchestva sadovodov	Transactions of Odessa Horticulturists' Society
Tr. Peterb. obshch. estestvoisp.	Trudy Peterburgskogo obshchestva estestvoispytatelei	Transactions of St. Petersburg Naturalists' Society
Tr. pochv. -bot. eksp. Peresl, upr.	Trudy pochvenno-botanicheskoi ekspeditsii Pereslavskogo upravleniya	Transactions of the Soil-Botanical Expedition of; Pereslavl Administration
Tr. po geobot. obsled. pastb. Azerb.	Trudy po geobotanicheskim obsledovaniyam pastbishch Azerbaidzhana	Transactions of Geobotanical Investigations of Azerbaijan SSR Pastures
Tr. Odessk. otd. R. obshch. sadov.	Trudy Odesskogo otdeleniya Rossiiskogo obshchestva sadovodov	Transactions of Odessa Branch of the Russian Horticulturists' Society
Tr. prikl. bot. (gen. i sel.)	Trudy po prikladnoi botanike, genetike i selektsii	Transactions of Applied Botany, Genetics and Selection
Tr. Ross. Obshch. sadov.	Trudy Rossiiskogo obshchestva sadovodov	Transactions of the Russian Horticulturists' Society
Tr. SAGU	Trudy Sredneaziatskogo Gosudarstvennogo Universiteta	Transactions of the Soviet Central Asian State University
Tr. Sarat. obshch. estestvoisp.	Trudy Saratovskogo obshchestva estestvoispytatelei	Transactions of the Saratov Naturalists' Society
Tr. Sil'sko-gospod. komit. bot.	Trudy sil'skohospodar'skoho komiteta botaniky	Transactions of the Botanical Agricultural Committee
Tr. SPb. obshch. estestv.	Trudy Sankt-Peterburgskogo obshchestva estestvoispytatelei	Transactions of the St. Petersburg Naturalists' Society
Tr. Tadzh. bazy AN SSSR	Trudy Tadzhikskoi bazy AN SSSR	Transactions of the Tadzhikistan Base of the Academy of Sciences of the USSR
Tr. Tbil. bot. inst.	Trudy Tbiliskogo botanicheskogo instituta	Transactions of Tbilisi Botanical Institute
Tr. Tbil. (or Tifl.) bot. sada	Trudy Tbilisskogo (Tifliskogo) botanicheskogo sada	Transactions of the Tbilisi (Tiflis) Botanical Garden
Tr. Turkmensk. bot. sada	Trudy Turkmenenskogo botanicheskogo sada	Transactions of the Turkmenian Botanical Garden
Tr. Turk. nauchn. obshch.	Trudy Turkmenenskogo nauchnogo obshchestva	Transactions of the Turkmenian Scientific Society

Vest. Akad. Nauk (or AN) Kazakhsk. SSR	Vestnik Akademii Nauk Kazakhskoi SSR	Bulletin of the Academy of Sciences of the Kazakh SSR
Vestn. estestv. nauk	Vestnik estestvennykh nauk	Bulletin of Natural Sciences
Vestn. Ross. Obshch. sadov.	Vestnik Rossiiskogo obshchestva sadovodov	Bulletin of the Russian Horticulturists' Society
Vest. Tifl. bot. sada	Vestnik Tiflisskogo botanicheskogo sada	Bulletin of Tiflis Botanical Garden
Vizn. (or Vznachn.) rosl. URSS	Viznachnyk roslin USSR	Key to Plants of Ukrainian SSR
V obl. polupustyni	V oblasti polupustyni	(In the) Semidesert Region
Yadov. rast. lugov i pastb.	Yadovitye rasteniya lugov i pastbishch	Poisonous Plants of Meadows and Pastures
Zam. po sist. i geogr. rast.	Zametki po sistematike i geografii rastenii	Notes on Taxonomy and Geography of Plants of the
Tbil. bot. inst.	Tbilisskogo botaniche- skogo instituta	Tbilisi Botanical Institute
Zam. po fl. EL'T	Zametki po flore El'tona	Notes on the Flora of Elton
Zap. Rievsk. Obshch. Estestv.	Zapiski Kievskogo obshche- stva estestvoispytatelei	Reports of the Kiev Society of Naturalists
Zap. NOVOROSS. obshch. Estestv.	Zapiski Novorossiiskogo obshchestva estestvoispy- talei	Reports of the Novorossiisk Society of Naturalists
Zhurn. Bot. obshch.	Zhurnal Botanicheskogo obshchestva	Journal of the Botanical Society
Zhurn. opyt. n. agron. Yugo- Vost.	Zhurnal opytnoi agronomii Yugo-Vostoka	Journal of Experimental Agronomy of the Southeast





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